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PROGRESS IN SOVIET AGRICULTURAL RESEARCH

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PROGRESS IN SOVIET AGRICULTURAL RESEARCH

Science is of no mean importance for technical progress in agriculture. On the other hand, due to its multipurpose nature agriculture cannot be satisfied with advancements in any separate branch of science being always in need of help extended by its numerous branches.

That is why, in the Soviet Union so much importance is attached to the development of research for field raising crop yields productivity of animal husbandry and other sections of farm production.

At present the USSR has some 800 agricultural research centres including 138 research institutes, 96 state agricultural multi-purpose experiment stations, each serving its administrative area, 317 specialised experiment stations and 224 other experimental establishments.

In addition to this, an extensive programme of research is carried out by agricultural colleges and universities which make a total in the USSR of 99.

1554 state-owned plots serve to test crop varieties bred by selection institutions. These plots covering the whole of the Soviet Union's territory do not limit themselves to testing new varieties and finding out the most suitable ones for this or that area, but also carry out research in agro-technics of crop-growing.

According to the data as of January I, 1958 the scientific-research staff of agricultural research establishments in the Soviet Union runs to 16,400. This number does not cover over 14,000 people engaged in research in agricultural colleges and universities.

Both, research and educational establishment are training young scientific personnel in the post-graduate courses for three years. The bulk of their time the post-graduate students spend carrying out research according to the topic chosen, studying experimental technique and literature on their speciality. Usually, most eminent scientists train post-graduates in methods of research.

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All the expenses for agricultural research and educational establishments are allocated from the state budget. In 1958 these allocations have already reached 710,000,000 roubles. Besides, the scientific establishments make large amounts of money by selling produce obtained on their own farms.

The research institutes and experiment stations, as a rule, own large experimental farms, from several hundreds to a few thousands ha of arable land, necessary number of cattle, machinery and respective scientific equipment. On plots and farms of the research and educational establishments along with experiments, seeds of the best crops varieties and young pedigree cattle are propagated to be sold to collective farms. Many of the establishments are in possession of specialised seed-breeding nurseries and pedigree cattle sheds.

The Lenin All-Union Academy of Agricultural Sciences unites 33 major research institutes of national importance and some 100 experiment stations and research bodies subordinate to the institutes of the Academy. The research institutes and their experiment stations are of branch nature and cover all the main branches of agricultural science.

In view of the fast growth of scientific personnel and scientific progress, in the national republics making up the Soviet Union, in the Ukraine, Belorussia, Kazakhstan, Uzbekistan and Georgia, republican academies of agricultural sciences were set up to unite major scientific establishments within each republic. These academies conduct research to promote further development in agriculture in their republics. At the same time, having at their disposal qualified scientists the academies of agricultural sciences in the Union Republics lead the Soviet Union in some branches of the science. Thus, the Uzbek Academy is the chief advisor in the USSR in cotton-growing, irrigation and irrigated farming, the Ukrainian Academy in sugar beet growing, corn and winter wheat, the Belorussian one - in drainage and reclamation, potato-growing, etc.

To provide for overall scientific service of agriculture in some parts of the country there are regional multipurpose experiment stations and zonal scientific-research institutes serving groups of adjacent regions similar by nature. These establishments are multipurpose in their research instead of being confined to a particular branch of science.

The research institutes and experiment stations are very close to practice and their research is aimed, first and foremost, to meet the production requirements of State and collective farms.

As a result of the work conducted by institutes and experiment stations for years, first-rate varieties of crops and farm stock have been bred to meet the needs of any part of the country.

Big strides have been made in the selection of winter and summer wheat, highly-productive varieties of these crops were bred with a whole complex of economically-valuable properties. For winter wheat the best results were obtained by Odessa Selection Genetics Institute (Academician

F.G. Kirichenko), in the Krasnodar Region (Academician P.P. Lukyanenko) and by others. The important thing here is that quite a new crop was created by Academician Kirichenko of Odessa - hard winter wheat.

For spring wheat varieties are especially noted in the Soviet Union the Research Agricultural Institute of the South-Eastern Zone (Saratov), Institute of Grain Farming in Kazakhstan (Akmolinsk) and many other selection-experiment establishments.

A number of valuable corn hybrids have been bred of late in the Soviet Union: B P-25, B P-42, Dnieper-56, etc. (by Sokolov in Dnepropetrovsk and Khojinov in Krasnodar) which are now being quickly introduced in production.

Good progress has also been made by the All-Union Institute of Oil-Bearing Crops (Krasnodar Region, Academicians: V.S. Pustovoit and L.A. Zhdanov) in the selection of highly oil-bearing crops of sunflower. In the last six years the sunflower oil content has been raised by 7-8 per cent and equals 44-48 per cent and for some of the lines - as high as 54 per cent with absolutely dry seeds. Introduction of such varieties on an area of 1,700,000 - 1,800,000 ha will result in an additional annual yield of 130,000 - 150,000 tonn vegetable oil.

High-grade sugar beet varieties were also bred, such as one-seed beet, new varieties of cotton, flax and other crops.

The activities of the All-Union Institute for Plant-Breeding greatly help towards effective selection, it has a wide collection of farm crops from all the areas of the Soviet Union and some foreign countries. The collection numbers about 150,000 variety-samples which are widely used by experiment establishments as initial stock for the purpose of selection. The Institute sends other institutes and experiment stations of the Soviet Union some 50,000 seed-samples annually, gathered both at home and abroad.

Zootechnical scientific-research establishments in collaboration with pedigree - cattle State farms and collective-farm hands have bred a number of highly productive species of cattle, pigs, sheep, etc. Artificial insemination technique is now being elaborated which will afford prolonging the storage life of the semen and transporting it a long way off so as to impregnate by the sperm of one sire hundreds and thousands of female head of cattle.

Also great pains are being taken to find more rational methods of feeding, keeping and care of cattle with a view to sharply cutting labour-consuming operations and the cost of production.

Extensive research has also been undertaken in the field of mechanisation and electrification of agriculture. Research and designing are being carried out not only in agricultural research establishments but also in the designing offices and labs of factories and works. This combined effort of scientists and engineers of machine-building works not only makes for designing most economical and productive machinery and equipment but also for their serial production on an industrial scale. Today, in view of the rapid expansion of animal husbandry the problem of mechanisation in this branch of agriculture comes into the foreground.

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Of late, an increasing attention has been paid to the development of research in agricultural economics. The All-Union Institute of Agricultural Economics in Moscow is the chief scientific centre in this field. It has a vast network of local research centres and four branches in different parts of the country.

Besides, scientific-research institutes for agricultural economics are functioning in the Ukraine, Belorussia, Kazakhstan, Uzbekistan, Armenia and in other Union Republics.

The branch and zonal scientific-research institutes and experiment stations include special economics departments.

Soviet economists elaborate the problems of specialisation and distribution of agriculture over the whole country and within the limits of this or that area, study the ways of decreasing the cost of production and labour use in agriculture, the questions of application of self-financing principle in collective and State farms as well as in repair and technical stations. A special care is being taken of the problem of further perfection of the prices for products of agriculture and animal husbandry, etc. The results of research carried out by economists are widely used by collective and State farms, by planning organs in the elaboration of the problems of further development of agriculture.

It is impossible in a brief report like this to give even a general account of the matter and results of the many-sided scientific studies conducted in the USSR in the sphere of agriculture. To make up for that, these problems are thoroughly dealt with in more special literature published in the USSR.

The Lenin All-Union Academy of Agricultural Sciences, republican academies and their scientific-research institutes are extending and strengthening the ties with their counterparts abroad. These ties find their expression in mutual visits to respective institutes and experiment stations and personal acquaintance with research carried out, as well as in the form of exchange of literature, research methods, seed-samples and planting stock, participation in various international conferences, congresses, symposiums, etc.

Thus, in 1957 through international book-exchange 1527 magazines and 3132 books and monographs were sent to and received from abroad, besides, we bought from foreign countries 613 magazines and 468 books. The institutes and libraries subscribe to a great number of foreign scientific periodicals. Exchange in seed-samples has increased. In 1957 Soviet scientific establishments sent abroad, on request from foreign scientists 7718 seed-samples and received in exchange 6471 samples. At present 600 crop varieties from abroad are being tested in the USSR yet only few of them proved valuable in our conditions, though some of them are already widely used. The main idea of exchange of seed samples is not their propagation for practical purposes but making use of them in selection, hybridization with local varieties.

In 1957 the Agricultural Academy and its Institutes were visited by over 130 foreign scientists while 120 members of the scientific staff of our Academy went abroad. In addition to this, there is an active exchange of

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groups of agriculturists who study the experience of scientific institutions without directly participating in scientific activities. Many foreign scientists are visiting the Agricultural Exhibition in Moscow.

13 eminent foreign scientists have been elected Corresponding Members of the Academy which is an important contribution to the cause of friendship between different countries in the sphere of agricultural science.

The strengthening of bonds between scientists from different countries, personal contacts, and exchange of materials is undoubtedly a substantial condition for the development of science, mutual cooperation and assistance. That is why Soviet scientists always welcome the idea of meeting their foreign colleagues as their friends.

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SYSTEM OF PURCHASE PRICES, CONDITIONS AND ORDER  
AGRICULTURAL PRODUCE PROCUREMENT  
IN THE U.S.S.R

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Great importance is attached in the U.S.S.R. to the systematic consolidation and development of economic connections between various branches of national economy, and particular attention is given to the strengthening of the ties linking industry and agriculture.

The state plans for the development of national economy stipulates that industry should supply agriculture with the necessary machines, equipment, fertilizers, fuel, building materials needed, at prices fixed according to state plans. Agriculture, in its turn, supplies the state with the necessary amount of provisions and raw agricultural produce, also according to plan and at planned prices.

The system of goods turnover and the system of prices for agricultural produce and industrial commodities, makes it possible to distribute material resources and national income according to plan. Therefore our country attaches first-rate importance to the implementation of correct policy in the procurement of agricultural produce and in its prices. This policy of procurement and prices has always been determined according to the economic and political situation in which the country found itself at this or that stage of its development. In the implementation of the procurement and price policy, the necessity of consolidating the alliance between the working class and the peasantry; of increasing the output of agricultural produce; of satisfying the growing requirements of the population in provisions and these of industry in agricultural raw produce as well as the necessity of improving the material standards of the people have always been taken into consideration. With these objects in view, the forms and conditions of procurement and the price system underwent certain changes. Thus for instance, after the civil war, when our country entered a phase of peaceful development, state institutions and co-operative bodies took care of the procurement of agricultural produce by means of purchases in the market at prices determined by offer and demand, with the state exercising appropriate control over them. The control on the part of the state was aimed at developing economic ties between the city and the countryside promoting successful socialist construction in our

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country; at the observing of the necessary proportions in the first place at safeguarding the preferential development of heavy industry. At the same time, the Government took constant care that the development of agriculture should be encouraged and that the economic interests of the peasantry should not be encroached upon.

1. Procurement and price system in the  
period from 1928 to 1953

In the period of socialist reconstruction, when industry was developing at a rapid rate, and on this basis agriculture was undergoing reorganisation according to socialist principles - it became necessary to change the form taken by the procurement of agricultural produce and of stabilizing the state procurement prices for the produce which was being added to the resources of the state.

In 1928 a system of purchasing grain and some other kinds of agricultural produce by means of contracting was introduced; in 1932-1933 obligatory supplies of agricultural produce by collective farms and peasant households to the state as well as the payment in kind for work done by the machine and tractor stations were not only determined by the necessity of reliably safeguarding the ever increasing requirements of the country in provisions and in agricultural produce in connection with the rapid growth of cities and industrial centres, but also by the interests of a successful completion of the socialist reconstruction of agriculture itself.

In the period when the collective farm system was being created and consolidated, the economic links between industry and agriculture, between the state on the one hand and the collective farms on the other had necessarily to assume special forms. The collective farms were under the obligation of delivering part of their marketable produce to the state at procurement prices which, as a rule, were lower than the prices established at the market, and they also had to deliver part of their produce as payment in kind for the work done at the machine and tractor stations. The state, in its turn, undertook to cover all the expenses for supplying agriculture with modern farm machinery. Apart from this, huge investments were made into capital construction, into building of irrigation and hydro-melioration systems, repair factories and works, into seed-growing, pedigree work and other enterprises. Great advantages were given to collective farms in the return sale of industrial goods on favourable terms, in the payment of taxes, in credits, etc. In the last four years alone, the state spent 75,400,000 roubles on capital construction and on the acquisition of farm machinery. All this was a reliable safeguard for implementing the socialist reconstruction of agriculture, for the victory of the collective farm

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system and for the creation of a material basis making it possible to ensure the steep rise in agriculture which has been taking place in the last few years..

So it came about that special forms of economic ties between the state and the collective farm sprang into being in the period of socialist reconstruction of agriculture and in that of the organisational and economic consolidation of collective farms. It was the state that directly bore the expenses in connection with supplying machinery to agriculture and it made investments in the capital construction of the most important projects. These expenditure were covered by what the state received as payment in kind to the machine and tractor stations and partly by establishing reduced prices for the produce that went to the state as part of the obligatory deliveries. In that period this form of economic ties between the state and the collective farm was progressive in nature, it corresponded to the law of planned proportional development and was based on value.

After 1933, great economic and political changes took place in the country. A mighty industry was created, the collective farm system emerged from its struggle victorious and consolidated, and as a result the development proportions in some branches of the national economy underwent certain changes. The economic basis of socialism in the development of heavy industry, - not only preferential, but unprecedented in history as far as the rate of development is concerned. Under these conditions the distribution of the national income was guided in the first place by considerations of the necessity for a rapid development of heavy industry. The prices for industrial goods were increased, but the procurement prices for agricultural produce remained at the same level as before.

Naturally, under these conditions the value ratio in the economic relations between industry and agriculture was partially disrupted, and as a result the material interest of the collective farms and farmers in increasing the output of agricultural produce was reduced. This became one of the principal reasons for the disproportion which sprang up between the requirements for foodstuffs and raw materials on the one hand and the level of production on the other.

## 2. System of procurement and prices in the period between 1953-1958

Beginning with 1953 the Government took a number of steps aimed at a steep rise in agricultural production. Among them was the restoration of the necessary value ratio in the economic relations between industry and agriculture.

The restoration of value proportions in the exchange of products of labour between industry and agriculture was

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Carried out in two ways; in the first place, at the expense of an abrupt rise in capital investments into agriculture made by the state. In the course of the last four years the state spent more funds for capital construction and the purchase of tractors, combines and other farm machinery than in the preceding 18 years. Second, the conditions for the procurement of agricultural produce were considerably improved from the economic standpoint, with the object of creating material encouragement for the collective farmers in increasing the output of agricultural produce. To achieve this, the quotas of obligatory deliveries of grain, meat, milk, potatoes and other products to the state were reduced and higher purchase prices were established. This rise in the prices of agricultural produce gave the collective farms an additional annual income of over 50 thousand million roubles in cash.

Important steps were also taken for making the agricultural leadership more democratic in nature, and for encouraging by all possible means the economic initiative of collective farms. This found a definite expression in the introduction of a new order of a new order of agricultural planning, in which collective farms were given the right of introducing changes and amendments into the model rules of the agricultural "artel" in those cases when such changes were necessary.

These and other measures brought about definite positive results.

The reorganisation of the machine and tractor stations and the sale of farm machinery directly to the collective farms brought about great changes in the economic relations existing between the state and the collective farms. As a result of this fact, the objective necessity arose of changing the forms and conditions of procurement on collective farms.

Under the forms and conditions for the procurement of agricultural produce, which had hitherto existed, the collective farms had delivered their marketable produce to the state through various channels;

- 1) as obligatory deliveries, at reduced procurement prices,
- 2) as part of the produce purchased by the state at higher purchase prices,
- 3) as payment in kind for the services of the machine and tractor stations.

Apart from the ordinary procurement price, high additional prices were paid for industrial crops as a bonus.

In the procurement of many kinds of produce, the state sold industrial goods to the collective farms at favourable prices.

The produce delivered as payment in kind, was partly covered by the expense incurred by the machine and tractor stations when they carried out mechanised works for the

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social-owned economy of the collective farms.

The general expenditure of the state for the procurement of agricultural produce was considerable after 1953, and its total was fully or approximately equal to the value ratio in the exchange of products of labour between city and village. Consequently, the distribution of the national income between industry and agriculture was in keeping with the demands of the law of planned and proportional development of agriculture. This is confirmed by the fact that in the last few years a steep rise in the development of production became noticeable in agriculture. Yet there were some shortcomings in the distribution of the national income by means of state investments in the procurement of agricultural produce. This was noticeable within the framework of agriculture as a whole, as well as in individual groups of collective farms and in definite districts of the country. One of the manifestations of these shortcomings lay in the fact that the ratio in the level of prices for individual kinds of agricultural produce lacked the necessary economic foundation. Prices for certain kinds of produce, such as raw cotton, flax, fibre, hemp, sunflower seed and some others, were high, and this safeguarded big profits for the collective farms specializing in the production of these crops. On the contrary, the prices of meat, and in some regions those of grain were low, - a fact which reduced the material interest of the collective farms in increasing the output of this type of produce. Such a ratio in the level of prices for the most important kinds of agricultural produce predetermined a certain disproportion in the distribution of the part of national income which was invested in the procurement of agriculture throughout the various parts of the country.

In 1958, due to the increase in the prices for meat, grain, and some other kinds of produce, an economic basis was created for the price level ratio of the most important agricultural produce. This forms the objective basis for a more regular distribution of national income among the various regions of the country by means of the price levels.

There also were some shortcomings in the distribution of the national income by means of prices among various groups of collective farms. The farms, whose activities were conducted in better natural and economic surroundings, were putting out more production, although their expenses were lower. They had the possibility of selling a considerable part of their produce to the state at higher prices, and to deliver their produce in industrial crops on top of the plan receiving additional payments and bonuses for them. The payment which such collective farms received from the state for one centner of the same type was considerably higher than that of the others. Under the system formerly in existence, the state had no possibility for redistributing its additional income according to plan in the form of differential rent of the first type. The collective farms which were operating under good natural and economic conditions, often disposed of the additional incomes themselves.

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The new purchase prices of the basic products of agriculture are considerably higher than the average sale prices which in the past were formed on a factual basis. This rise in prices was brought about by the reorganisation of machine and tractor stations and by the direct sale of farm machinery to the collective farmers. Now under the new conditions, it is the farmers themselves who will carry the expenditure for the purchase, maintenance and use of tractors and other farm machinery, that is, the funds which in the past were expended by the state through the medium of machine and tractor stations, will now be laid out by the farmers themselves. It is easy to understand that these new additional expenses incurred by the collective farms will have to be covered by the prices fixed for the marketable produce which is being sold to the state.

### 3. New order of procurement and new purchase prices for agricultural produce

Taking into account the changed economic conditions of agricultural production on collective farms, the Soviet Government took the decision of abolishing as from July 1, 1958, the obligatory state delivery of agricultural produce by the collective farms. The payment in kind for the work carried out by the machine and tractor stations and the repairing and technical stations was also abolished.

The Government established unified, economically well-founded purchase prices, differentiated according to the various zones of the country, in keeping with the natural and economic conditions under which agricultural produce is being put out. The additional payments in the form of bonuses for selling agricultural produce to the state on top of the plan, and the sales of industrial commodities (sugar excepted) at favourable prices were also abolished. The farmers who deliver sugar beets to the state, can still buy sugar at a price which is considerably below the retail prices fixed by the Government. This order of selling sugar at a reduced price to the farmers delivering sugar beets has been preserved in consideration of a long-standing tradition. At the same time new unified prices have been fixed for machines, equipment, fuel, building materials etc. These prices are obligatory both for collective farms and government enterprises.

The state will continue to plan the purchase of agricultural produce from collective farms. The experience of our country in the planning of such purchases has shown that they are advantageous both for the state and the agricultural enterprise. For the state, the planning of purchases is a guarantee that the Government will have at its disposal a definite amount of foodstuffs and agricultural raw materials, while for the collective farms it is a guaranteed sale of marketable produce. More than that, the collective farms can get from the procurement organisations an advance payment covering from 20 to 30 percent of the entire cost of the marketable produce which is to be sold to the state according

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to plan.

Taking into consideration that the purchase prices for agricultural produce are a most important planning factor in the hands of the state, our Government attaches particularly great importance to the scientific foundation of prices. This is confirmed by the fact that a large group of scholars and highly qualified specialists in economics took part in the process of working out the procurement conditions for agricultural produce and in determining the level of prices. Before coming to a decision about the changes to be introduced into the conditions for the procurement of agricultural produce and about the level at which the new prices are to be fixed, the Soviet Government engaged in a preliminary study of the proposals made by specialists in economics and by practical workers in agriculture.

#### 4. Economic foundation for purchase prices

In working out the economic foundation for the new prices at which agricultural produce is purchased, the following principles were accepted as a basis: in selling their marketable produce to the state, the collective farms must carry out the sale at purchase prices enabling them to cover their expenditure involved in the output of their produce (cost) and to secure a net income necessary for the further development of production.

Our task in working out an economic foundation for the new purchase prices was considerably facilitated by the fact that in the Soviet Union the planned and factual expenses (cost) incurred in putting out agricultural produce on state farms have been calculated for many decades. More than that, in the last few years the calculation of planned and factual cost of production has also been largely practiced on collective farms. This practice of studying the expense of production is being generalized on a large scale, and the results of such generalization work are used in solving the most important economic problems in agricultural production. The generalization of data derived from practice has also proved useful in determining the standards of net profit which the collective farms should get through the medium of prices. As practice shows, any collective or state farm must have a price level ensuring a net profit of 30 to 35 per cent which is necessary for further successful development.

In establishing the new purchasing prices, the Soviet economists who worked on the problem naturally took into account that even with a most ideally founded system of prices, individual agricultural enterprises would have a different standard of profit, because of the differences of the cost level of a unit of produce. The lower the cost of a unit of produce, the higher the standard of net profit.

The following average prices for the basic kinds of agricultural produce have been established and introduced as

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from July 1, 1958 for the Soviet Union as a whole (see appendix).

These prices are differentiated according to the various union republics. This differentiation is made by the governments of the union republics in accordance with the natural economic regions and depends on the conditions of production. The range within which zonal prices can fluctuate may be seen on the example of soft wheat which may cost from 65 to 85 roubles per centner. The lowest prices for grain have been fixed in the regions of the Northern Caucasus, the southern and central regions of the Ukraine and Kazakhstan, while the highest prices are to be found in the north-western regions of the country where production is considerably more expensive.

In the economic substantiation of zonal prices, the mean data concerning production conditions over a period of many years are taken as a basis (including mean data concerning yields and the cost of one centner of produce over a period of many years). In doing so, it was taken into account that production conditions may differ from zone to zone, from one administrative region to another and even from one individual farm to another. Yet the importance of such differences may be reduced to a minimum by means of introducing a high degree of specialization in agricultural production.

The new purchase prices are stable and mobile at the same time. They are stable because they remain unchanged under ordinary production conditions, but in case of any abrupt changes in these conditions which make them deviate considerably from the average, the prices are amended by raising or cutting them according to circumstances. In a number of regions in our country production conditions undergo drastic changes according to the weather. On dry years the farms incur great expenses and if prices remain unchanged, the profit is low. On the contrary, particularly favourable weather conditions may lead to high profits while expenses remain at the usual level. Such year-to-year changes in the income of the collective farms make it difficult for them to develop their economy according to plan and to adequately organize production. In the years when yields are low, the state aids the collective farms by supplying them with seed, credit, etc. When, on the contrary, yields are good, the prices which the collective farms get from the state are too high in comparison with the factual expenses of production. The mobility of prices eliminates these shortcomings in a manner which is in keeping with the interests of both collective farms and the state.

The proposal of introducing agricultural produce prices which are both stable and mobile was universally welcomed and supported by farmers and agricultural workers.

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In examining the question of the purchase price level, it should be borne in mind that in our country the changes taking place in the level of purchase prices for agricultural produce do not affect the retail sale prices established by the state. Thus, for instance, in the last few years the purchase price for agricultural produce were considerably raised, while at the same time state-established sale prices for bread, meat and other kinds of produce were substantially cut. Consequently the increased material encouragement of the development of agricultural production, offered in the form of raising purchase prices, does not affect retail sale and has therefore no bearing on the real standards of living in our country.

The Soviet Government considers that one of its most important tasks in the field of domestic policy for the nearest future is the drastic cutting of expenses involved in putting out a unit of production both in industry and in agriculture - a step which will set up an economic basis for the further reduction of retail prices and consequently help in raising the living standards of the Soviet People.

Alongside the reorganisation of the machine and tractor stations and the direct sale of farm machinery to the collective farms, the new conditions for the procurement of agricultural produce are an important stimulus for increasing the output of provisions and agricultural raw materials. In combination with the sharp drop in the cost of production, it will promote the further development of economic initiative on collective and state farms.

Our country still has tremendous unexploited resources which will allow a considerable increase in production and a cut in its cost, bringing about increased profits for all agricultural enterprises.

# APPENDIX

## AVERAGE LEVEL OF STATE PURCHASE PRICES FOR THE SOVIET UNION AS A WHOLE

	Roubles per centner
Cereals (average)	74
Sunflower seed	172
Potatoes	40
Sugar beets	23.5
Raw cotton	340
Flax fibre No.8	2,300
Hemp No.5	2,300
Livestock and poultry (live weight)	
Cattle (medium fat)	619
Sheep (medium fat)	536
Pigs (for pork)	786
Pigs (for bacon)	1,081
Pigs (for fat)	826
Hens and chickens	895
Ducks and geese	738
Milk	115
Eggs (10 piece)	6
Wool - unwashed, normal quality	4,100
fine	
semi-fine	3,290
coarse	2,370

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CHANGES IN AGRICULTURE OF THE  
USSR

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As a result of the deep social revolution and industrial growth, agriculture of the USSR underwent big changes.

In pre-revolutionary Russia out of total 367,000,000 hectares of agricultural lands landlords, monasteries and tsar family had 152,000,000 hectares, while 20,000,000 individual peasant farms possessed 215,000,000 hectares, of which 80,000,000 belonged to kulaks who exploited hired labour. So the share of working peasantry, which constituted 85% of peasant families (about 16 million farms), was only 135,000,000 hectares or less than 37% of total agricultural lands.

The Great October Socialist Revolution nationalized the land and gave it to working peasantry. Late in twenties and early in thirties individual peasant farms in the USSR were voluntarily united in collective farms: kolkhozes, which were given for termless use, i.e. for ever, previously private owned lands. Moreover, state agricultural enterprises-sovkhozes were organized in the USSR and part of land makes special state land funds.

The Socialist revolution in agriculture strongly changed the type of agricultural enterprises. Instead of small individual farms, which in 1927 accounted about 25 million, big mechanized enterprises were organized in the form of kolkhozes and sovkhozes. By July 1, 1958 in the Soviet Union there were already about 78,000 kolkhozes and 5,800 sovkhozes, and only 100,000 individual farms remained.

By the beginning of 1957 total area of agricultural lands in the USSR attained 549,000,000 hectares (as compared with 376,000,000 before the Revolution), of which 390,000,000 hectares were given for ever to collective farms and, besides that, on long-term account collective farms have 59,000,000 hectares from the State Land Fund. State farms possess 100,000,000 hectares.

At present each collective farm all over the country has, on average, 1954 hectares of arable land, but some collective farms in steppe regions have 5 to 10 thousand hectares of arable land each. The big size of collective farms allows them to widely apply agricultural machinery. Average sown area in state farms is 31,500 hectares and there are collective farms which cultivate 50 to 60 thousand hectares.

The Socialist revolution in village, unification of individual farms into collective farms, and their supply with modern machinery became possible owing to the priority development of heavy industry which is the principal base of the Soviet Union economy and, in particular, owing to the development of engineering industry.

## 2.

Power per one agricultural worker. Now socialist agriculture in the USSR has quite modern machinery. This sharply changed the technical and cultural level of agricultural production and made it possible to increase productivity of labour. Within the period from 1934 to 1956 the yield of agricultural products in sovkhozes per one man-day increased 3.6 times in grain, 1.6 times in milk, and 2 times in pork. In collective production of collective farms productivity of labour increased by 48% from 1950 to 1956.

In 1929 out of all energy resources in agriculture only 0.4 horse power fell per one worker, and in 1956 this figure already became 3.5 horse powers and per 100 hectares of sown land in the same years there were 19 and 54 horse powers respectively. In 1917 working animals made 99.2% of total energy resources in agriculture. In the beginning of 1957 94.6% already fell on mechanical engines and only 5.4% on working animals.

In 1929 total energy resources in agriculture were 21.3 million of horse power of which working animals made 20.2 million, while early in 1957 total energy resources attained 117.1 million of horse power, of which mechanical engines made 110.8 million of horse power.

The rates of growth in machinery supply of agriculture can be illustrated by the following figures.

(In thousand, by the beginning of the year)

	<u>1933</u>	<u>1941</u>	<u>1946</u>	<u>1954</u>	<u>1957</u>
Tractors in terms of					
15 h.p. machines	148	684	491	1239	1577
Grain combines	14	182	148	318	385
Trucks	14	228	62	424	631

The military aggression of Hitlerite fascist Germany against the Soviet Union and the long devastating war caused enormous damage to our national economy, including agriculture, hampered technical progress in agriculture and the rates of its supply with machinery. But the large-scale heavy industry we had in our possession allowed not only to rehabilitate, but also to considerably overcome the pre-war level of machinery supply of collective and state farms. In comparison with 1940, the number of tractors, grain combines, and trucks early in 1957 increased 2 to 3 times; these machines were more productive and economical. At present our industry provides our agriculture with about 250 thousand tractors (in terms of 15 h.p. machines) each year.

The increased level of energy per one worker in agriculture made it possible to attain a high level of mechanization of principal works. In 1956 ploughing was mechanized to 98%, sowing of cereals to 97% and harvesting of cereals to 89%. Simultaneously with supply of agriculture with tractors, trucks and other machines with mechanical engines, electric power consumption in agriculture was also growing. In 1956, as compared with pre-war 1940, it increased 9 times and was 2.5 times higher than electric energy consumption by the whole national economy in pre-revolutionary Russia.

At present the construction of a number of big hydro-electrical stations on the Volga, Ob, Angara, Yenisey and on other big rivers opens wide prospects for electrification of agriculture.

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Distribution of Population. The USSR is known by its rapid industrial development and growth of urban population and, in the first place, of working class which is increased, to a considerable extent due to the reduction of rural population. The growth of agricultural production was attained in conditions of decrease in the number of rural population. This can be illustrated by the following data.

	<u>Million of people</u>		
	<u>1913</u>	<u>1940</u>	<u>1956</u>
Total population	159.2	191.7	200.2
Rural population	131.1	131.1	119.2
Urban population	28.1	60.6	87.0

In 1913 75% of the population worked in agriculture, in 1956 in agriculture there were only 43%. In future specific weight of rural population will reduce more as the production will be mechanized to a greater extent.

Agricultural and Sown Lands. An essential characteristics of agriculture in the USSR is the size and structure of sown land. The total area of cultivated land in the USSR (1956) is 211,700,000 hectares, of them in collective farms: 172,100,000 and in state farms: 34,300,000 hectares. In recent years, due to the mastering of virgin and unused lands in eastern regions of the country (mainly in Kazakhstan, Siberia, the Volga river region) the area of arable land was increased by 36,000,000 hectares and a new big grain-production base, mainly for commercial spring wheat, was created in the East, which considerably improved the grain balance and increased the possibilities of exportation.

Besides arable land our country has vast areas of other agricultural lands, in particular, about 385,000,000 hay-mowing pasture and unused lands, about 880,000,000 of forests, bushes and other forested lands and 188,000,000 hectares of swamps. Certain part of these lands can be brought to more intensive usage, provided, however, that much work is done on their land reclamation and irrigation. It should be taken into account that very vast areas, mainly pastures, are situated in arid and semi-arid regions and are distinguished by low productivity. This limits the possibility of their more intensive utilization.

The change of size of sown land in the Soviet Union is characterized by the following figures:

	<u>in million hectares</u>					
	1913 (within present day boundaries)	1928	1940	1945	1953	1956
Total area of sown land	118.2	113.0	150.4	113.8	157.2	194.7
Cereals	104.6	92.2	110.5	85.3	106.7	128.3
including:						
wheat(all sorts)	33.0	27.7	40.3	24.9	48.3	62.0
corn for grain	2.2	4.4	3.6	4.2	3.5	9.3
Technical cultures	4.9	8.6	11.8	7.7	11.5	13.1
Vegetables, me- lowfield cultures and potatoes	5.1	7.7	10.0	10.6	10.3	11.6
Fodder crops	3.3	3.9	18.1	10.2	28.7	41.7

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As compared with 1913, in 1956 sown lands increased more than 1.5 times, while wheat crops almost 2 times. Only in the last three years (1954-1956) sown lands increased by 37,500,000 hectares, mainly due to the mastering of new lands and due to the more intensive utilization of arable lands.

The structure of sown lands under cereals also changed considerably. The specific weight of wheat and corn increased. The structure of cereal crops is shown in the following table (in %)

	1913 (within pre- sent-day boundaries)	1940	1953	1956
Total area of sown lands under cereals	100	100	100	100
including				
wheat	31.6	36.4	45.3	48.3
Rye	27.8	21.1	19.1	14.4
Corn	2.1	3.3	3.3	7.2
Barley	12.7	10.2	9.0	9.3
Oats	18.3	18.3	14.4	11.7
Buckwheat	2.1	1.9	2.5	2.1
Millet	3.4	5.4	3.8	5.0

The sown lands under cotton increased from 688,000 hectares in 1913 to 2,065,000 hectares in 1956, while gross yield of raw cotton during the same period increased 6 times. Cotton is grown in the USSR in the Central Asia Republics and partially in the Transcaucasus on irrigated lands. Average yield of raw cotton in the USSR is 20.8 centners per hectares. The greatest yields are obtained in the Tadjik SSR where in 1957 on average 26.5 centners of raw cotton per hectare were harvested.

Sugar beet is cultivated in the USSR on a large scale and more than 2,000,000 hectares are occupied by this culture as compared with 676,000 hectares in 1913. Sugar beet production is especially developed in the Ukrainian SSR, Central Black-Earth Regions and North Caucasus of Russian Federation. Sugar beet production moves to new regions and it is planned to increase, in the nearest future, the crops of this culture approximately by 3,000,000 hectares. This will allow to increase sugar production to approximately 32 or 35 kg per capita. In 1957 average yield of sugar beet in the country was 182 centners per hectare. In this year it is planned to obtain a little larger crop.

In the north and north-west regions of the country visible place is occupied by flax. In our country about 1,700,000 hectares are now under this crop. The main purpose of flax cultivation is to increase its yield.

Changes in livestock. One of the most important agricultural problems of the USSR is the problem of livestock development. In comparison with other branches of agriculture livestock developed more slowly. But beginning with 1954 when the Government of the USSR worked out and began to fulfill an extensive programme of rapid development of agriculture, big success was attained in livestock both regarding growth of livestock population and increase of productivity.

The number of livestock in the USSR in all categories of farms is characterized by the following figures:

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	in million			
	Cattle	Including Cows	Hogs	Sheep
By January 1, 1955	56.7	26.4	30.7	98.9
By January 1, 1956	58.8	27.7	34.0	103.3
By January 1, 1957	61.4	29.0	40.8	108.1
By January 1, 1958	66.7	31.4	44.3	120.1

Not only the number of cows did increase in the recent years, but also the yields of milk increased drastically. In 1953 average country-wide yield of milk per one cow in collective farms was 1016 kg, in 1957 it already attained 1858 kg and in some regions (Moscow region, Riazan region and some others) yield of milk per one cow achieved more than 3000 kg. In state farms yields of milk is higher than in collective farms and is, on average, 2700 kg. In 1957 milk production in the USSR was 54,700,000 tons and increased, in comparison with 1954, by 43%. Now we produce milk almost as much as in the USA (95%), and already a little more butter is produced in our country. On average all over the country 110 centners of milk were produced per 100 hectares of agricultural lands in 1957, some regions made a considerably greater success and produce milk per 100 hectares: 525 centners in Moscow region, 442 centners in Leningrad region, 444 centners in the Latvian SSR, 375 centners in the Estonian SSR, etc.

Now all conditions have been provided for still faster growth of milk production both due to the increase in the yield of milk and to the increase in the number of cows.

From 1954 to 1957, as compared with previous four years, meat production increased by 26% and special increase was made in pork production. But now measures are being taken to provide faster growth of beef and poultry meat production.

The growth of principal livestock products is characterized by the following figures.

	in million tons				
	1913	1940	1950	1953	1956
Meat and lard (in live weight)	7.9	7.5	8.1	9.4	10.7
Meat and fat (in carcass weight)	5.0	4.7	4.9	5.8	6.6
Milk	29.4	33.3	35.3	36.5	49.1
Wool (in 1000 tons)	192	161	180	235	261
Eggs (in billiony)	11.9	12.2	11.7	16.1	19.5

Collective and state farms rapidly increase the number of all kinds of livestock, improve its productivity and thereby create necessary conditions for the further growth of meat production and of other livestock products. In 1957 state purchases of meat, as compared with 1956, increased by 12%, of milk by 18%, of eggs by 30% and of wool by 14%.

Fodder Production. A decisive condition for the further development of livestock is the increase by all means of fodder production. In the recent years, owing to the growth of grain production and expansion of corn crops, the fodder base became considerably stronger.

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In 1956 fodder cereal crops, as compared with 1953, increased almost by 8 million hectares or by 28%; silage crops during the same period increased almost by 5 million hectares, or 3 times; hay-mowing areas under annual and perennial grass for dry and green fodder were expanded by 8,400,000 hectares or by 34%. In 1956, in calculation per 1 cow, collective farms prepared 5.7 tons of silage as compared with 3.1 tons in 1953.

In 1956 corn for grain, green fodder and silage were 23,900,000 hectares. This is almost 7 times more than in 1953. In 1957 collective and state farms prepared about 90,000,000 tons of silage, of which corn silage was 52,000,000 tons.

The experience of recent years has shown that a decisive crop for the increase of fodder production is corn.

Moreover, extensive work is being carried out to improve meadows and pastures, to increase crops of clover, alfalfa and other grass.

Commercial Production of Agriculture. The Socialist revolution in agriculture, the creation and strengthening of collective farm system, equipment of collective and state farms with modern machinery, the availability of skilful specialists and managers made it possible to considerably increase commercial production of field crops and livestock products.

The growth of commercial agricultural production in the USSR is characterized by the following figures.

	in million tons				
	1913	1926	1940	1953	1956
<u>Field crops harvested</u>					
<u>in the corresponding</u>					
<u>year</u>					
Grain (million tons)	22.4	10.3	38.3	35.8	61.2
including					
Wheat "	8.4	5.4	16.2	21.8	41.8
Raw cotton	0.74	0.53	2.24	3.85	4.33
Sugar beet	11.3	5.9	17.4	22.9	31.5

	in million tons				
	1913	1926	1940	1953	1956
<u>Livestock products</u>					
<u>during corresponding</u>					
<u>year</u>					
All kinds of meat and lard (in live weight)	3.4	2.4	4.2	5.4	6.2
Milk and dairy products (in terms of milk)	7.0	4.3	10.8	13.7	20.4
Sheep, goat and camel wool (greasy basis, in 1000 tons)	77	36	120	198	223
including fine and semi-fine wool	22	6	27	69	103

It is necessary to bear in mind that the above mentioned figures include only those commercial agricultural products which were

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given and sold to the state and co-operatives and also the products which were sold at a market to the non-agricultural population. These figures do not include the commercial products which make up internal rural turnover, i.e. selling of agricultural products by collective farms and farmers to each other.

The Main Goals of the Further Growth of Production. The attained level of the development of agriculture and the volume of agricultural production, in the main, meet the food requirements of the population, and our country has a possibility to export some important agricultural products.

But for the purpose of the further rise of well-being of the people and, bearing in mind the necessity of expanding our foreign trade, our agriculture is confronted by a great task of increasing production of grain, meat, milk and live-stock products as well as of technical and other crops.

For the purpose of fuller supply of the demand of the country for agricultural products, our agricultural production should be brought, within several next years, to the following amounts,

Grain - 180-200 million tons  
 Potatoes - 140-145 -"-  
 Vegetables - 25-30 -"-  
 All kinds of  
 meat and lard -20-21 -"-  
 Milk - 100-105 -"-  
 Sugar - 0 - 10 -"-  
 Raw cotton - 6- 6.5 -"-  
 Flax-fibre - 550-600 thousand tons.

The main task of agriculture is the further increase of grain production as the basic of successful development of other branches. Requirements of the country in bread have already satisfied, but, bearing in mind the growth of livestock requirements for grain to use as fodder are sharply increased.

In the nearest future we must raise to a higher level livestock and to overtake the USA in production of meat, milk and butter per capita. According to preliminary data, in 1957 in the USSR production of all kinds meat per capita was 36 kg, while in the USA about 100 kg, milk 268 and 336 kg respectively and butter 3.7 and 4.2 kg respectively. This task will be solved due to the rapid growth of the number of all kinds of cattle, hogs, sheep and poultry and by increasing their productivity. On January 1, 1958 the USSR, in comparison with the USA, had the following number of livestock ( in million)

	<u>USSR</u>	<u>USA</u>
Cattle	66.7	94.0
Hogs	44.3	51.6
Sheep	120.1	31.3

But we plan rapid rates of growth of the number of livestock. During last three years the number of cattle in the USSR increased by 10,000,000 or by 17.7%, including cows by 5,000,000 or by 19%. Only during 1957 the number of cattle increased by 5,300,000 (8.6%) and cows by 2,400,000 (8.3%). At the same time in the USA the number of cattle during last 3 years diminished by 2,600,000 or by 2.7%,

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including reduction in the number of cows and heifers by 2,300,000 or 4.8%. In 1957 the number of livestock in the USA continued decreasing. Analogous regularities are also characteristic of other kinds of livestock. A comparison of these data shows that here are quite different trends in the variation of the number of livestock and the rates of growth accepted in the USSR allow to solve the problems of economic competition with the USA in production of livestock products within a short period of time.

We have no danger of overproduction and collective farms are sure of full sale of the products by profitable prices.

As is known, the vast territory of the USSR is distinguished by a great diversity of natural and economic condition in different regions of the country. We have subtropical region where tea and citrus fruits are produced, regions of Extreme North specialize on deer-breeding and fur hunting. In Kazakhstan, Siberia and Volga regions with their fertile soils but with arid climate highly mechanized grain production is developed. In Bielorussia, Baltic Sea Republics and neighbouring regions, precipitations are abundant and conditions here are especially favourable for the development of dairy production and bacon pig breeding, for cultivating flax, potatoes and vegetables. In Ukraine, Moldavia and North Caucasus with their rich soils and favourable climate agriculture is of many purpose character. Here together with production of a great amount of commercial grain, sugar beet sunflower and other technical crops are grown as well as horticulture and viticulture are developed. In these different regions intensive livestock is rapidly developing. The Central Asia Republics are specialized on cotton-growing, commercial horticulture and viticulture and pasture stock-raising is developed in mountain and semi-arid regions.

Taking into account the diversity of the conditions in which agriculture develops in various parts of the USSR, at present many scientists and specialists work out a scientifically grounded type of farming in conformity with the peculiarities of individual natural and economic zones of the country. More correct specialization and correlation of the branches are determined, method of intensification of production, of partial application of scientific achievements and of the experience of advanced collective and state farms are worked out.

Economists synthesize the scientific data prepared research-workers from all other branches of knowledge and elaborate principal problems of all-round development and intensification of agricultural production in conformity with natural and economic regions and throughout the whole country.

The materials which are now being worked out by scientists and specialists on rising the level of field crops and livestock will be laid in the basis of the further development of agriculture in the corresponding zones of the country and will be used by planning bodies when working out long-terms for the future.

HIGHER AGRICULTURAL EDUCATION IN THE USSR  
By Professor I. Kuvshinov

The Soviet higher agricultural school trains specialists for agriculture which plays an important part in the national economy of the Soviet Union. With a view to creating an abundance of foodstuffs and providing our industry with raw materials, a special programme has been worked out in this country to ensure a steep rise in all branches of agriculture and a sharp increase in the output of grain and animal products. Agronomists, zootechnicians, engineers and other specialists -- graduates of the higher agricultural school -- have a big role to play in the realization of this important task. Highly qualified experts are leaders of agricultural production at collective and state farms and machine and tractor stations.

In order to fulfil successfully these tasks, agricultural specialists must have an extensive and profound scientific knowledge and organizational experience; they must govern the life of plants and animals, be acquainted with the latest machines and collective - and state-farm production. These qualifications they acquire at the higher agricultural school which has been widely developed in view of the large scale and important tasks of Soviet agriculture. The Soviet Union has a vast network of higher, secondary and other agricultural schools with agro-technical mechanical schools, and zoo-technical courses.

Since 1917 the higher and secondary schools have trained hundreds of thousands of specialists. In 1956, about 500,000 specialists with higher or secondary education worked in agriculture.

Higher agricultural education in the USSR is promoted through institutes, academies and special faculties at universities.

The following data gives an idea of the development of higher agricultural education in our country since 1917.

Pre-revolutionary Russia had only nine agricultural higher establishments and nine agronomical faculties at universities and polytechnical institutes with a total student body of 8,000. In addition, there were four veterinary, one forestry and one land-surveying institutes. In 1958, Soviet republics can boast of 98 higher institutions with 200,000 students. Besides, there are numerous correspondence courses which enable 40,000 people to study without interrupting work.

Higher agricultural establishments are run by the USSR Ministry of Agriculture.

Closely connected with agricultural education is training of forestry specialists. The Soviet Union has 11 forestry academies and institutes in which over 30,000 students are enrolled.

The higher agricultural establishments mould new cadres of specialists and serve as centres of agricultural scientific thought. In conjunction with collective and state farms and machine and tractor stations they work to put the achievements of science and

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advanced experience into practice.

The main aim of the higher agricultural school is to train broad specialists who can fully meet the requirements of mechanized collective and state farms with their numerous branches of economy. The institutes and academies graduate agronomists and zootechnicians, veterinaries, engineers in mechanization and electrification of agriculture, irrigation engineers and agricultural planners. Besides, they train highly-qualified specialists in vegetable and fruit growing and in viticulture, soil science and agricultural chemistry, protection of plants, subtropical cultures, sericulture, and hunting.

Young men and women, children of workers, peasants and intelligentsia, who have finished secondary or agricultural technical schools, can enter any of the country's higher agricultural establishments after taking the entrance examinations in languages and literature, physics and chemistry. Those entering agricultural engineering institutes must also take an examination in mathematics. Priority is given to persons with two or more years' practical experience in agriculture, industry or other branches of the national economy.

Agricultural students have favourable conditions for studies. They are provided with accommodation in hostels and receive a state stipend of 300-400 rubles a month. Students who have excellent marks receive a higher stipend (25 per cent more). In addition, there are special stipends named after prominent statesmen and scientists, from 500 to 700 rubles a month, which are given to the best students. Education in higher schools is free of charge.

The students have at their disposal very complete libraries, well-equipped study rooms and laboratories, experimental stations and farms, stadiums and clubs.

Each higher school has several faculties and departments which train experts in various branches of agriculture. The main academic body of the school is the chair made up of professors and teachers of one, two or three allied subjects. All chairs have their own laboratories, museums, experimental stations and fields.

The course of training is from 4½ to 5 years; for correspondence courses the term of studies is 6 years.

The curriculum provides a solid theoretical and practical training of agricultural specialists. Here for example is the curriculum for agronomical faculties. Special attention is paid to ideological and political education of young people. Students in the 1st and 2nd years study the history of the Communist Party of the Soviet Union, in the 3rd and 4th years they study political economy and in the 5th year -- dialectical and historical materialism, thus acquiring a progressive materialist world outlook. During the first years the students are taught fundamentals of higher mathematics, physics, botany, Darwinism and zoology, anatomy and physiology of animals, physiology of plants and biological chemistry, microbiology, non-organic, analytical, organic, physical and colloidal chemistry, soil science with fundamentals of geology, meteorology and climatology. These subjects constitute a general biological and physical-chemical basis for thorough special training of the students. During the first two years they gain knowledge in geodesy and learn the mechanics of tractors, automobiles and agricultural machines. Special subjects envisaged in the curriculum are thoroughly studied in the last years (3rd, 4th and 5th) with the purpose of giving the students deep scientific knowledge in plant breeding and livestock farming, mechanization and electrification of agriculture, agricultural economics and organi-

zation of socialist agricultural enterprises.

Future agronomists acquire knowledge in plant breeding by studying the following subjects : general agriculture with methods of experiment, melioration, agricultural chemistry, plant breeding, selection and seed growing, vegetable and fruit growing, cultivation of meadows, forestry, entomology and phytopathology, storage and technology of agricultural produce.

The students are acquainted with the methods of breeding and raising cattle, with particular branches of cattle-breeding and dairying.

The training of agronomists as organizers and agricultural economists is realized through studying the organization of agricultural enterprises, economics and planning of agriculture, statistics and bookkeeping. Storage and food industry. Today special attention is paid to improving the economic education of specialists.

In the first years the students are taught a foreign language (English, French or German).

Those who wish choose one of optional subjects : methods of popularizing scientific achievements and advanced experience apiculture, pond pisciculture, agricultural premises and others.

Special subjects concern climatic conditions of the region where the future specialist will work.

Great importance is attached to physical training of the students and drawing them into various sports circles.

The forms of instruction employed in the school are the same as in all other higher educational establishments. The student attends lectures delivered by professors and instructors, does independent work on a theme, carries on practical work in laboratories, study rooms and at experimental stations and becomes acquainted with the specific production in which he is specializing.

Practical work helps the students to master theory and acquire initiative for independent scientific research. This is necessary for the specialists of socialist agriculture who must be innovators always standing in the forefront in the drive for bigger harvests and increased animal productivity, for constant increasing of agricultural production.

The higher agricultural schools pay particular attention to training the students for independent creative work at an enterprise. The students work systematically on a theme, carry out research and write end-term theses on special subjects.

Nearly every higher agricultural establishment has its scientific circles and societies whose work is directed by professors and teachers. The students carry on interesting research and prepare reports on urgent scientific problems, thus acquiring initiative for independent scientific work. Periodically, the higher establishments hold scientific conferences at which they invite students from other schools. The best students' works are published and awarded prizes.

The entire system of upbringing and education in the higher agricultural school is aimed at training highly-cultured, trained specialists and public figures. The students study in groups of 25. The group discusses questions

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of discipline and progress in studies, books read by the students, organization of recreation, etc. The students attend political and scientific lectures, visit museums, cinemas and theatres, participate in amateur art circles, organize sports activities and trips in the country.

The training of the future agricultural specialists is supplemented with practical work for which the curriculum allocates from 25 to 30 per cent of the time. Here, for example, is how it is organized at agronomical faculties. During the first two years the students carry on their practical work at experimental stations and farms and at subsidiary enterprises of the school. Third and fourth year students practice at the best machine and tractor stations, collective and state farms.

In the first year practical work lasts 5 weeks, in the second -- 15, in the third -- 18 and in the fourth -- 22 weeks. During his practice the student fulfils all kinds of agricultural jobs, both easy and difficult. First - and second - year students work in the sphere of field-crop growing, cattle breeding and other branches of farming.

Special attention is paid to the work of students as tractor-drivers and operators of complex agricultural machines. Simultaneously, they practise in botany (systematization of plants) geodesy, geology, physiology of plants, and other subjects, and learn methods of experimenting.

The third and fourth-year student works at a collective or state farm or a machine and tractor station as a team-leader assistant and later as the assistant of the agronomist thus acquiring both agrotechnical and organizational experience. Each student must consider it his duty to actively participate in the struggle for higher yields of all agricultural crops and for rise in cattle-breeding.

As a rule, practical studies are carried on at a time when field work is at its height. This makes it possible to combine theory with practice, and teaching with productive labour.

Naturally, practical work of other faculties has its peculiar features. For instance, future zoologists, while receiving general agronomical training, attach great importance to work at animal-breeding farms.

The students of veterinary institutes have their practice at veterinary clinics. Future specialists in mechanization and electrification of agriculture gain practical knowledge at machine and tractor stations, in repair shops and at agricultural machinery plants.

The work is directed by professors, docents, assistants and experts in agricultural production.

A two- or three-week excursion to advanced farms and research institutes and stations completes the students' practical work.

At the end of the training course the students take final state examinations or submit graduation thesis. The student chooses the theme of his thesis in the 4th year of studies, works at it during his practical work, conducts independent research and collects necessary material. In the last year, he completes the thesis and defends it at the open sitting of the State Examination Commission. Here are some themes worked out by the students of the Timiryazev Agricultural Academy in recent years : the use of distant hybridization method in the selection of perennial rye outside of Moscow ;

spring wheat in the non-black-earth zone ; cultivation of sugar-beets at Khmel'nitsk region ; analysis of collective-farm economic activities ; fight against weeds with the help of chemicals ; organization of pasture maintenance of cattle ; utilization of the milk productivity of horses in Bashkiria ; non-root feeding of vine ; the soils of one of the Orel collective farms and their characteristics ; cost of production in Moscow Region.

After graduating from the higher agricultural school the young specialists work at collective and state farms, at machine and tractor stations or at experimental enterprises.

Graduates of the Agricultural institutes and academies are prepared both for practical work in various fields of production and for scientific and pedagogical activity. Today more than 1,200 students are taking post-graduate courses where the term of studies is three years. The courses accept people with higher agricultural education who have practical experience and aptitude for research work. In the course of training post-graduates study philosophy, extensive literature on the chosen and allied professions, work as teachers at schools and carry on researches into urgent agricultural problems under the direction of professors. In the last year post-graduates publicly defend dissertations for Master's Degree.

In addition to pedagogical work, above 12,000 professors, instructors, assistants and teachers of the higher agricultural and forestry school are engaged in researches into major problems of agricultural science.

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Apart from their educational and research work agricultural institutes and academies conduct extensive and manifold activity in popularizing scientific advances and progressive innovations and introducing them into collective and state farm production. They render constant practical help to collective and state farms, machine and tractor stations and best workers of agriculture, fighting for higher crop yields and an increase in animal productivity.

The forms and methods of assistance are varied. The scientists give lectures and deliver reports at conferences of collective farmers and agricultural workers, arrange oral and written consultations for practical workers, speak over the radio on urgent agricultural problems, write articles for newspapers and magazines, publish pamphlets, books and textbooks.

The institutes and academies provide collective and state farms with seeds and planting material of new highly-yield crops, young pedigree cattle and poultry, and introduce new machinery.

Scientific workers and students are frequent guests at collective and state farms and machine and tractor stations. They help local practical workers run their husbandry on a high agrotechnical level and expand production.

Scientific workers and students study and popularize the progressive methods of foremost farms and help them organize district and regional agricultural exhibitions. Many experimental farms and stations and scientists are participants in the USSR Agricultural Exhibition, which is a remarkable school of scientific advanced experience.

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Very often prominent collective-farm workers -- combine operators, milkmaids, brigade leaders, agronomists, collective farm chairmen, directors of machine and tractor stations and state farms -- come to institutes and schools and deliver reports on their work and achievements.

• Such are forms and methods of cooperation of science and practice.

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DEVELOPMENT OF AGRICULTURE IN THE CENTRAL  
ASIAN REPUBLICS WITH UZBEKISTAN  
AS AN EXAMPLE

By K.M. Djalilov,  
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The Central Asian Republics forming part of the Soviet Union, were extremely backward from the economic point of view in the past. They had no industry, and their agriculture was in a state of decadence. The farmlands and the water resources were, as a rule, in the hands of landowners who possessed large stretches of land. The immensely rich natural resources of these regions remained unexploited, and many of the farmers had no land. The material and cultural level of life was extremely low. These were regions of overall illiteracy.

Although agriculture is impossible without irrigation under the conditions of Central Asia, the irrigation and water-supply network did not develop. Before 1918, in the period when the population of these regions was cruelly exploited by landowners and capitalists, there was no irrigation and no reclamation of new lands in those parts. In the pre-revolutionary period the area of irrigated lands in Central Asia amounted to about 4 million hectares, that is 2.6 percent of the total farmland area.

Before the revolution, cotton-growing was the principal commercial branch of agriculture in Central Asia, just as it is now. Yet the yields of raw cotton were extremely low, amounting to 10 or 11 centners per hectare. The yield of fibre amounted to 25-28 per cent, the length of the fibre ranged from 20 to 22 mm., and the weight of one cotton boll was about 3.5 - 4 gr.

Cotton-growing was based on manual labour, and the agro-technical level was extremely low. Many peasant households had even no draught animals, and the entire production process was done by hand. The total cost of the basic means of production in a peasant household constituted on an average several scores of roubles, and the annual gross income amounted to 450 roubles. A bondage system of rent and statute labour were widespread. The farmers had often to give up the greater part of their crops as rent. The productivity of labour in cotton-growing was extremely low; the production of one centner of cotton involved from 28 to 30 man/days of working time.

After the October Socialist Revolution tremendous changes occurred in the economy of Central Asia as a whole, and particularly in agriculture. This can be demonstrated on the example of the Uzbek S.S.R.

Uzbekistan occupies a territory of 409,400 square kilometers and its population totals 7.3 million people. Out of

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this number 5.1 million people are villagers.

By January 1 the Republic had 1396 collective farms, 172 state farms, and 110 repairing and technical station, and 35 machine and tractor stations.

The total area used for farming purposes, including pastures, constitutes about 45 million hectares, including 3.7 million hectares of arable lands. On 2.5 million hectares out of this number the crops are watered, and 1.2 million hectares are non-irrigated lands.

In the course of the last 40 years, the sown areas have been extended by the reclamation of new irrigated lands, large irrigation canals and reservoirs have been built. The total length of the irrigation and draining network in the Republic amounts to 160,000 kilometres, and there are over 9,000 hydro-technical constructions of the engineering type in existence. The total capacity of all canals has been brought to 7,000 cubic metres of water per second, against 1.5 thousand cubic metres in 1913. Apart from this, 1.2 million hectares of watered lands have been reclaimed and prepared for exploitation.

At present collective farms are the principal producers of basic agricultural produce. They put out 85 per cent of raw cotton, 45 per cent of grain, 72% karakul skins and the overwhelming majority of other kinds of agricultural produce.

Both collective and state farms are large mechanized enterprises. In 1956, the average sown area of one collective farm amounted to 1368 hectares, and the average cash income of one farm exceeded 5,000,000 roubles. State farms are organized on a still larger scale.

The technical reorganization of agriculture on the basis of mechanical energy and electrification was started in the very first years of Soviet construction work. At present the agriculture of Uzbekistan has 64,000 tractors (in terms of 15 h/p), about 18,000 cotton-picking machines, 840 excavators, 2,250 combines and many more farm machines.

In the power resources of agriculture which amount to 3,139,000 h/p, 1,637,000 h/p fall to the share of tractors, while motor lorries have a total capacity of 1,291,000 h/p. The share of draught animals expressed in units of mechanical force amount to but 5 per cent.

In 1956 the mechanization of the ploughing and sowing of cotton was completed, and inter-row treatment was 95 per cent mechanized, while the mechanization in the removal of stalks attained 90 per cent. Such types of work as the drawing of watering furrows, the combating of pests and the application of mineral fertilizers are now almost completely mechanized. Manual labour can only be found in cotton-picking work. Our research organisation and designers' groups are working on evolving new types and kinds of machines and on improving the existing ones. We hope that in the next few years we shall be able to completely solve the problem of complex mechanization in all basic and auxiliary processes used in agricultural practice.

In the Soviet Union, labour is divided among the various union republics according to plan, and this finds its expression in the specialization of production.

The Uzbek S.S.R. specializes in the production of raw cotton, silk cocoons, karakul skins, dried fruit and bast crops such as "kenaf" (gambo hemp) and jute. Our Republic holds the third place in the world for cotton-growing (the U.S.A. and after China); the third place in the world in the production of silk cocoons (after China and Japan); and the fourth place in the world in the production of bast crops (after Pakistan, In-

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dia and China).

The extension of areas sown to cotton and other farm crops is combined with large-scale measures for improving soil fertility. The results of this work are particularly apparent in the development of cotton-growing.

While in 1913 the yield of raw cotton amounted to 12.2 centners per hectare only, in 1950 this figure rose to over 20 centners, and in 1956 it was brought to 21.9 centners per hectare. About 30 per cent of the agricultural enterprises in the Republic are now getting from 25 to over 40 centners per hectare.

As a result of the extension of areas sown to cotton and the increase in its yield, the total production of raw cotton in Uzbekistan has risen from 516,000 tons in 1913 to 2,858,000 tons in 1956, which means that to-day's figure is 5.6 times higher than that of the past. Moreover, the yield of fibre from raw cotton has risen to 33-34 per cent.

Due to the consistent introduction of mechanization and the application of the latest scientific discoveries, the standards of agriculture are rising and the most modern method of agricultural technique are being mastered.

From 1954 onward, the progressive method of hill-chop k sowing in combination with narrowed inter-row spaces and machine treatment in two directions, have been used on a large scale in the Republic. This method of tending cotton rapidly reduces the use of manual labour in a number of operations in cotton-growing which require a good deal of time and labour.

In order to increase soil fertility, grassland crop rotation is introduced into the farming system, and both mineral and organic fertilizers are being effectively used.

The introduction of a scientific system for cotton-growing on the basis of progressive agricultural methods and the complex mechanization of work had made possible a five-fold increase of the productivity of labour in cotton-growing. The expense involved in the output of one centner of raw cotton has fallen from 28-30 men/days in 1913 to 6-7 men/days in 1957. The application of mineral fertilizers has become more effective, the material and financial expenses involved in cotton production have dropped, while the profitability of cotton-growing and the wages of the cotton-growers have gone up accordingly.

At present work on a seven-year plan for the development of agriculture is nearing completion in the Republic.

According to preliminary estimates, the production of raw cotton will rise to 4 million ton in 1965, and to 6 million ton in 1970. This will require a further extension of sown areas and an improvement in yield. To carry out the plan for the gross production of cotton, it will become necessary to increase the areas sown to this crop up to 1,600 thousand hectares, with a yield of 25 centners per hectare.

In connection with cotton-growing, other agricultural specialities are also developing in the Republic.

Uzbekistan puts out about 50 per cent of all silk cocoons more than 40 per cent of all fruit, grapes and karakul skins produced in the Soviet Union.

All these branches of agriculture are included in the cotton-growing complex, that is, they develop in the basis of the same possibilities which accompany the development process of cotton-growing.

Alongside its achievements in plant-growing, the agriculture of Uzbekistan is also successful in livestock breeding, particularly in the raising of karakul sheep.

By January 1, 1916, the Republic had 2,800,000 million head of goats and sheep. In the last 40 years the number of head of these animals increased 2.5 times. The level of 1916 was also exceeded in the number of cattle which now amounts to 1.8 million head.

The number of pigs has increased from 2,800 head to 209,000 head.

Great changes have also taken place in the breeds and yields of animals and in the entire system of stockbreeding, with the object of improving pedigree work, a number of state centres for artificial insemination and animal husbandry has been set up.

The development of fodder production due to the introduction of cotton-alfalfa crop rotation and the number of livestock now existing in the Republic make it possible to increase the production of meat 2.5 times before 1965 and to treble the output of milk. Per capita production will amount to at least 400 kilograms of milk and from 50 to 60 kilograms of meat (in slaughterhouse weight).

The development of versatile agriculture with many specialities makes it possible to use more effectively farmlands, water resources, farm machinery and manpower and to considerably increase cash income.

In the post-war years (in comparison with 1940) the total cash income of collective farms rose from 2,200,000,000 roubles to 10,400,000,000 roubles. The increase in cash income brought about a steep rise in the material and cultural standards of agricultural workers and made it possible to invest considerable funds in industrial, cultural and public utilities construction.

In 1917 there was not a single Uzbek specialist with higher education in the entire Turkestan territory. There were only 160 primary schools with an attendance of 17,800 pupils.

In the years of Soviet power, Uzbekistan became a Republic of complete literacy and a highly developed culture.

With the development of national economy and culture, the network of higher and secondary special schools is expanding. Our Republic has 36 higher schools which were attended in 1955-1956 by 66,000 students. Our 100 hundred technical and other special secondary schools have an attendance of over 58,000. In 1956, over nine thousand young specialists graduated from Uzbekistan's higher schools, against 2,800 people in 1940.

In the various branches of Uzbekistan's national economy and culture there were 59,250 specialists with higher education, among them 10,190 engineers, 4,298 agronomists and zootechnicians, 7,322 doctors, while the number of specialists with a secondary education amounted to 65,250 people, including 14,300 technicians.

By January 1, 1956 the Republic had theatres, over 3,500 libraries, 3264 clubs, houses of culture, houses of folk art, and other cultural and educational institutions.

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Uzbekistan has 96 research institutions, including the Academy of Sciences and the Agricultural Academy. The scientific workers employed in higher schools and research institutions numbered 6,421 people in 1956, among them 183 doctors and 2,100 masters of science.

Together with the other Republics of the Soviet state, Uzbekistan has developed from the backward and economically underdeveloped country which it was in the past into a modern, economically powerful Republic with a strong industry, progressive agriculture and a highly cultured population.

The steep rise of national economy in general and of agriculture in particular is in the first place determined by the fact that the October Socialist Revolution put an end to feudalism. Land became the property of the state and was given to the peasants free for tilling and exploitation; now it has been placed for all times at the disposal of collective farms. The water resources have also become state property. The petty households of the farmers were merged into large collective farms.

These successes are also accounted for by the great material help extended to Uzbekistan and the other Central Asian Republics by the Union Government. For instance, in Uzbekistan alone over 4,000,000,000 roubles was invested in irrigation constructions in the last few decades; and as a result important irrigation canals and reservoirs were built.

The union government has given to Uzbekistan particularly great help in the equipment of agriculture with modern farm machinery, in the training of specialists and in the general rise of the Uzbek people's cultural standards.

The concentration and specialization of agricultural production were of great importance for the development of agriculture in the Republic.

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LACK OF INSTITUTIONAL FLEXIBILITY IN AGRICULTURE

By

Rudolf Bicanic

University of Zagreb

I Some Theoretical Concepts

1. Social Institution
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3. Non-financial Elements

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## LACK OF INSTITUTIONAL FLEXIBILITY IN AGRICULTURE

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(Terms of reference: persistence of non-financial elements, both in commercial and subsistence farming. Rigidity in the patterns of settlements and in the institutional structure)

### I Some Theoretical Concepts

1. A social institution may be called flexible, if an external disturbance causes adjustments or adaptations of its constituent elements (structural or functional) over time, without changing the fundamental social relations of the institution.

If there is no change we speak of inflexibility or rigidity of an institution. An institution lacks flexibility if its resistance to change is such that the external disturbances do not cause any alterations in its constituent elements; or if the change, when it occurs, alters the identity of the institution by changing fundamental elements. The strain in this case causing it to break but not to bend.

Dealing with flexibility, or with lack of it, we always have to look for an outside force which tries to induce changes in the institution (1).

By adjustment we mean changes in the functions of the institution, with no changes in structure. By adaptation we mean an alteration of the structure of an institution caused by outside influences.

2. There is a difference between functional and structural changes considered to be lesser changes on the one hand, and fundamental changes which bring about a qualitative difference in essential social relations among human beings on the other. E.g. a) If a peasant holding acquires more land, and the family members work it by increasing their labour efforts (increase in function), such a change will be a flexible one. b) If they acquire so much land that the

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(1) For considerations regarding a similar concept of flexibility limited to price mechanism of. O. Lange, Price Flexibility and Employment, Cowlee Commission Monographs No. 8, 1944, pp. 2, 3, 91.

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family labour is not sufficient to work it and hired labour must be permanently employed, the social change is fundamental, and the holding can no longer be considered a peasant family holding. c) But if for working the extended land the family buys machines, (and does not hire labour) then there is no fundamental social change, and the holding remains a family one. In the second case we have to deal with a rigid institution; in the first with a flexible adjustable one; and in the third with a flexible and adaptable one (i.e. change in structure) (2).

The fundamental elements of an institution can be varied, and they depend on the character of the institution. Malinowski, dealing with cultural changes, distinguished several (7) functions such as those covering essential physiological needs; personal elements; instrumental, technical, institutional, normative, operative elements, etc. He maintained that changes of one element lead to changes in others. (3) To Marx the fundamental element was the change of technology (development of production forces) which brought about institutional changes (the production relations).

3. The persistence of non-financial elements. Under financial elements we understand here results of economic activity aiming at profit in terms of money. Lack of flexibility regarding the profit motive thus means a situation where a change in agricultural institutions, motivated by profit expectation, is expected to occur, but such a change does not in fact take place. In extreme cases the institution disappears or fundamentally changes its social character, but does neither adjust nor adapt itself to the profit motive.

## II Population and Institution in Agriculture

The institutional approach in agriculture is of such importance that even the definition of agriculture has an institutional character. Many household auxiliary and ancillary activities which in a more developed economy belong to

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- (2) Regarding differences between fundamental and structural changes see J. Tinbergen, *Economic Policy*, 1956, pp. 4, 5, 149, 186. His definition of fundamentals could be differently classified. Marx called changes in production relations fundamental social changes.
  - (3) B. Malinowski, *The Dynamics of Cultural Change*, 1945, pp. 105-109. For a criticism of the functionalist theory of R. Cletcher, 'Functionalism as a Social Theory', *The Sociological Review*, Vol. 4, No. 1 VII 1955. Regarding social change of W. F. Ogburn, *Social Change*; R. Manheim, *Man & Society in the Age of Transition*; UNESCO, *Social Change & Social Tension*; T. Parsons & Smelser I. *Economy & Society*.

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another group of economic activities (manufacturing, transportation, building, etc.), in a lesser developed society are still considered as agricultural activities. Thus what is agricultural activity depends on the institutional development of agricultural organisation <sup>(4)</sup>. "Agriculture" here stands for economic activities of primary, secondary and tertiary industries, integrated in agricultural organisations in a society with undeveloped division of labour.

Agricultural institutions are influenced, and ultimately even fundamentally changed by many non-financial elements.

1. Population pressure is one of the non-profit motivated forces which may change the character of agricultural institutions. Childbirth is certainly a phenomenon where the profit motive is not the moving factor. On the other hand the number of family members remaining on land, or leaving it, is flexible and depends on both financial and non-financial considerations. We are dealing here with only a restricted aspect of the problem and are interested in the degree of flexibility or inflexibility <sup>(5)</sup> of agricultural institutions by movements of population according to social status. Sex differentiation also plays an important role in institutional flexibility. As there is a general tendency for the agricultural population to decrease in developed countries the question to be answered is - Who leaves agriculture first?

a) Most inflexible is the male owner-operator. b) then come the female owner-operators. The number of owner-operators of holdings has increased where land reform has taken place, and where population pressure leads to the dismemberment of rural holdings. c) Hired labour is next in inflexibility, and here again male agricultural workers are more mobile than female. In lesser developed countries however there is an increase of male hired labour, showing a tendency for the extension of labour (and not machine) using capitalistic development in agriculture. There is an increase of female hired labour in some well developed countries (as a consequence of the second world war?) although on the whole female hired labour decreases more rapidly than male. d) Unpaid family members are the least inflexible and move away from agriculture fastest.

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(4) "Measurement of Income Originating in Agriculture" ECAFE, E. CN. 11 STAT./Conf.3/3. 1953. UN ECOSOC

(5) The term mobility is used here for movements of individuals and flexibility for changes in institutions.

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Table I

Active Agricultural Population by Social Status  
(percentages of annual change)

		<u>Owner-operator</u>			<u>Unpaid family members</u>		
		<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
Japan	1947-50	+1.1	+8.1	+2.0	-4.5	-2.3	-2.9
Egypt	1937-47			-0.1			3.0
Mexico	1940-50			+10.8			-3.5
Jugoslavia	1931-53			+1.0			-0.3
Portugal	1940-50	-0.2	-1.3	-0.3	+2.1	-4.7	+0.2
Belgium	1930-47	-0.8	-1.4	-0.8	-1.9	-3.6	-2.6
W. Germany	1946-50	-2.1	-7.6	-3.2	-0.5	+1.5	-1.2
Ireland	1936-51	-0.4	-1.6	-0.6	-1.7	-3.2	-2.0
Gt. Britain	1931-51	-0.5	-0.6	-0.5	-4.6	-1.0	-4.2
Sweden	1945-50	-1.0	-1.8	-1.0	-6.1	+5.5	-3.9
Denmark	1940-53	+0.5	-3.8	+0.3	-	+0.8	+0.8
Norway	1930-50	+0.1	-1.3	0.0	-1.3	-	-1.3
Finland	1940-50	-0.2	-2.4	-0.6	-4.9	-2.1	-3.2
Canada	1941-51	-1.2	-4.3	-1.3	-5.0	+53.0	-4.3
U.S.A.	1940-50	-1.6	-2.4	-1.6	-3.8	+4.1	-2.3
		<u>Hired Labour</u>			<u>Total</u>		
		<u>Male</u>	<u>Female</u>	<u>Total</u>	<u>Male</u>	<u>Female</u>	<u>Total</u>
Japan	1947-50	+3.3	+5.	+4.0	-1.0	-1.2	1.1
Egypt	1937-47			0.32			0.15
Mexico	1940-50			-2.5			+2.6
Jugoslavia	1931-53			-2.8			+0.1
Portugal	1940-50	+4.4	+9.2	+5.1	+0.6	+0.7	+0.6
Belgium	1930-47	-3.0	-4.5	-3.2	-1.6	-3.3	-2.0
W. Germany	1946-50	-7.3	-5.1	-6.6	-3.8	-0.5	-2.1
Ireland	1936-51	-2.5	-	-2.5	-1.3	-2.4	-1.5
Gt. Britain	1931-51	-0.1	+6.2	+0.2	-0.84	+2.8	-0.4
Sweden	1945-50	-4.0	-	-.40	-2.9	+3.8	-2.5
Denmark	1940-53	-2.1	-2.9	-2.3	-1.0	-0.5	-0.9
Norway	1930-50	-1.0	-3.2	-1.2	-0.4	-1.7	-0.7
Finland	1940-50	+3.0	-6.7	+1.2	-1.4	-3.0	-2.1
Canada	1941-50	-0.9	-4.7	-0.6	-1.9	+9.0	1.8
U.S.A.	1940-50	-2.5	+3.3	-2.3	-2.4	+1.8	-2.1

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The figures in table 1 support the following tendencies: a) a relative decrease of agricultural population; b) an institutional resistance to change tending towards the weakening of the family holding, with the owner-operator showing comparatively the greatest immobility and the family members the greatest mobility; c) a tendency to deproletarianisation of agriculture, fast reducing the amount of hired labour. This last institutional change is a development which has been taking place ever since the second half of the nineteenth century in European countries, and which gradually spreads to other regions as economic development spreads. In England between 1871-1951 the number of owner-operators rose from each 100 to 112; the number of relatives working on the farm decreased to the very low figure of 21, and the number of workers to almost a half, only 55. In Italy the number of owners increased between 1871-1931 from 100 to 106, the sharecroppers increased to 118, and hired labour fell to 54. The same tendency is seen in France 1896-1946 where per 100 holdings using hired labour the number of owners increased to 130 and that of workers fell to 85. In USA between 1910-1950 the number of agricultural workers fell to 57, and that of farmers to 64.

In the most recent years, 1950-55, the mobility of workers and family labour in Europe has been somewhat reversed, and the workers have been moving out of agriculture faster than family members. It is due to the increasingly strong "pull in" factor of full employment in industry, which is even stronger than the already powerful "push out" factor of agricultural mechanization (6). This is also the case in countries with a quickly developing industrialisation, i.e. those in Eastern Europe, in spite of land reforms which were carried out on a large scale. Many agricultural workers in Yugoslavia preferred in 1945 to get employment in factories rather than remain on the land which they had got by land reform.

In the Soviet Union, on the other hand, in spite of accelerated mechanisation of agriculture there had to be a mobilization of 2% of the agricultural youth of the kolkhozes per year, to be transferred by compulsory recruitment to industry between 1940-1955. There are no published data of occupations by social status in USSR. But the number of kolkhoz homesteads reached its peak in 1950 (20.5 million) and is gradually falling to 1917 million, and in 1940 was only 18.7 million. At the same time the percentage of kolkhoz peasantry fell from 57.9 in 1937 to 41.2 in 1955 and reached 82 million. The numbers of sovkos workers increased 1940-45 from 1.8 to 2.8 and that of the MTS workers from 537,000 to 3,120,000. In 1953 the members of the tractor brigades were transferred from the status of kolkhozniks to that of MTS workers (some 1.8 million people) (7).

There is little data for long term comparisons of the very complex social status of agricultural population in underdeveloped countries, but it may be expected that this will follow the tendencies of mobility shown in the developed countries.

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(6) UN, ECE, Economic Survey of Europe in 1955, p. 170

(7) Narodnoe Kogvavstvo, p. 19, 128, 134, 138, 188

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### Entry and Exit

Population problems cannot be considered as changes affecting a mass of individuals. People live in social groups and population pressure manifests itself through tensions in and between social groups. Most of the agricultural social organisations are production and consumption units at the same time. These organisations are subject to many changes, and alterations in their personal structure come together with many other changes as well: instrumental, operational, technical, normative, etc. Thus the problem cannot be reduced to the system of land tenure as it is much more complex than that.<sup>(7)</sup>

We shall deal here only with extreme cases, those of fundamental inflexibility causing an increase or decrease in the number of units; enumerating briefly the causes of the entry and exit of such units in agricultural activity.

Entry and exit depend to a very great extent on socio-economic structure and its development.

1) In a tribal society the land is allocated to the new entrants (mainly newly wed couples) by the tribal head, from the common land, and the new household is included in the tribal economy.<sup>(8)</sup>

Exit is also regulated by tribal customs and relates to the death or expulsion from the tribe. In shifting agriculture, and in tribal or village organisations where there is a periodic redistribution of land entry is still less important, as all holdings are quite uniform and non-stimulative being equal and being able to operate within the customary tribal economy.

2) In a family economy, particularly that of a joint family, most often the family holding is perpetuated, as there is no change in continuity of the

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(7) For some recent international comparisons of agricultural institutions mostly connected with land tenure, see: Colin Clark, Conditions of Economic Progress III ed. 1955; UN, Land Reforms; W & S. Woytinky, World Population and Production; Sir John Russel, World Population and World Food Supplies; K. Parsons, Penn & Raup, Land Tenure 1956. Particularly for Europe: ECE-FAO European Agriculture, 1955; Folk Døvding, Land and Labour in Europe 1900-50, 1956; FAO The State of Food and Agriculture 1955; Rene Dumont, Les Systemes Agricoles, 1956.

(8) In the Bantu reserves in South Africa every newly wed member of the tribe normally gets about 0.4 hectares of land as his homestead, and around 4 hectares of arable land, which represents some one-eighth of the total tribal land, while seven eighths of land is used for common pastures. For each wife an appropriate amount of land is added.

(Contd. on next page)

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family holding when individual members of the family die. The exit of the family unit takes place only if the family dies out. Inheritance of land is the method of entrance. In countries where real division of land is the law there is great rigidity, farm holdings having to be split with almost every new generation (9). In countries where there is no real division but where consolidated farms as a whole are inherited there is more flexibility and less entry and exits of farms as such than in the previous case.

3) New entry can be made by purchase of land or farm, and this is the "normal" way in capitalistically developed countries, which consider farming as a specialised occupation, a trade or an enterprise. In this type of land tenure, the family cycle is not connected with changes in property, as there is a business continuity of the holding. In the commercial farm type there is a discontinuity of link between the farm and the family, and each has a specific institutional structure of its own.

In some countries there is an astounding rigidity of agricultural holdings (in particular Austrian agriculture shows such rigidity of size with practically no changes since the first world war). Exit of production units is due to many factors, including the natural death of the owner, migration from land, partition among successors and sale of parts of the land, or of the farm as a whole.

Inheritance means change of property without new capital investment, although the adequate paying out of other successors having some other occupation by

- (8) The cultivable land is given to the male as his personal holding which returns to the tribe when he dies. Nowadays there is some expectation on the part of the wife and children that the land of the deceased will be reallocated to them. D. Hobart Houghton, The Tomlinson Report (A summary of the findings and recommendations in the Tomlinson Commission Report, Johannesburg 1956); The Pattern of Race Policy in South Africa, Digest of South African Affairs, IV. 1956, State Information Office, Pretoria. For still stronger tribal relations in a more primitive agriculture in Kenya see S & K. Aronovich, Crisis in Kenya, 1946; C. K. Meek, Land, Law and Custom, in the Colonies, p. 76ff; Colonial Office, Land and Population in East Africa, HMSO, 1952; East Africa Royal Commission Report, Land & Population in East Africa (1953-55)
- (9) The old Tschayanov-Marxist controversy whether the size of land adjusts itself to the size of family or vice versa, is thus resolved as neither are independent variables. In modern agriculture where the role of land and manpower is being reduced, and capital investment is of ever increasing importance they depend on a larger system of equations, where many "push" and "pull" x, "in" and "out", factors play their role.

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those remaining on land means a steady outflow of capital from agriculture. On the contrary purchase of land from others than farmers can mean considerable inflow of capital into agriculture.<sup>(10)</sup>

Where there is concentration of land there is a greater number of net exits, as the statistics of U.S.A. and Great Britain show.<sup>(11)</sup> This drift out of agriculture refers mainly to small family farms, which could not adjust themselves to new conditions and disappeared as independent units.

4) In many countries of Europe, Asia and Latin America Land Reform secured the entry of many new small production units, by force of low dismembering the old estates and large farms. In some countries where substantial land reforms with distribution of land took place the number of production units increased by 20 or 30 or even 44 per cent. (Mexico). The effect was mainly that of levelling out differences in size. In fact land reform where land was actually divided speeded up two basically different and historically opposite trends. One was the process of decomposition of feudal or semi-feudal estates which were inefficient, but still resisted change, giving land into the hands of the more efficient peasant small-holders. On the other hand land reforms gave land to those victims of capitalistic development, the agricultural labourers and small peasants, for whom the concentration of land into ever fewer hands meant that they were crushed and deprived of their own lands. Political pressure and social justice requires that they should be given land which was their only means of subsistence, especially in countries where no other means of existence were available.

5) Collectivisation of land in Soviet type countries has as a consequence institutional change - the exit, as independent units, of millions of peasant holdings, which were reduced from the status of production units to the status of households (consumption units). Thus for ideological reasons, there was an impatient anticipation of the process of concentration of land by force of the State. This measure did not examine the flexibility of peasant holdings with regard to new economic and technical possibilities, but assumed their utter rigidity and inability to adapt themselves even when full employment of their resources had not been achieved. The result was that the anticipated economies of scale were offset by other factors, such as lack of personal initiative and efficiency in work; lack of flexibility in the centralised management to adjust means of production to

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(10) An expanded research of national accounts by sectors, with the agricultural sector properly defined, would be of great help in establishing the flows of current and capital transactions in and out of agriculture.

(11) The number of farms in U. S. decreased from 1950-57 by 802,000 or 14%, and in the United Kingdom from 1951-57 by 94,000 which is also 14%.

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their full use, etc. As this administrative change lacked material economic basis it was done by coercion and arbitrary measures, and the whole system became degressive and inefficient. (12)

The next institutional normative change was that of concentrating, by degree, in U.S.S.R., of about three kolkhozes into one, thus increasing the possibilities for economy of scale. But once more the administrative rigidity of centralised planning did not allow production to increase up to the possible standard, and since 1953, further organisational changes were found to be necessary to increase the flexibility of the kolkhozes, i.e. stimulation of producers by increase of prices; gradual relaxation and abolition of compulsory deliveries; generally more attention paid to peasant material interest. On the other hand the peasant kolkhozniks showed great tenacity, and changed the fundamental character of the plots which they had received under the new agrarian policy, so that instead of subsidiary self-subsistence production they were turned to commercial production of a more intensive type than the kolkhozes themselves. (13)

6) In the post-collectivisation period in countries which almost entirely abandoned the Soviet type of collectivisation, i.e. Yugoslavia and Poland, the peasants re-entered agricultural activity organised in family holdings as producers and consumers. A regeneration of agricultural production became evident after the kolkhozes were allowed to disband. The policy was first to increase production by letting the peasants make the fullest possible use of their own productive capabilities, helping them by allocating more investment funds to agriculture, and trying to supplement by organising co-operatives where the limits of small family holdings had been reached. On the other hand, first attention is given to the technological leap in efforts to increase agricultural production up to modern standards on the large socialist estates run by workers' management.

The whole system is liberated from administrative rigidity and a flexible system of land ownership exists, with free establishment of family holdings (free entry - although it is limited in Yugoslavia to a maximum of 10 ha of cultivable land per holding), and a flexible system of marketing (free market prices and free

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- (12) Cf. for Poland statement of M. Jaworski, UN-ECE Economic Survey of Europe in 1956, and of E. Lipinski, in ECE Economic Bulletin for Europe, 1957, No. 3, p. 31. The final judgment on Kolkhozes in Yugoslavia, expressed by the national assembly in 1957 was that experiment showed negative results; loss of interest of agricultural producers for their work, and decay of agricultural production. Therefore "nobody thinks any longer of collectivisation of agriculture in Yugoslavia" (S. Komar) - Federative National Peoples' Assembly, "The State of Agriculture, and co-operation, and the perspective for their development", 1957.

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sales of products).

7) Human vacuum in agriculture. A new development in European agriculture is a mass movement of people, particularly young people, from agriculture. This movement, whose obviously complex causes should be more closely examined, shows that in many countries there is a rural exodus even where economic conditions in a narrow sense do not justify it. In France in 1955 50% of the holdings over 30 ha had no successor, and in those below 10 ha the percentage was as high as 70%. In Western Germany, there is a tendency to an aging male agricultural population, and in Norway there are no sons remaining on land in many peasant families. Recently in some of the most fertile parts of Croatia (the Danubian plain) as well as in most mountainous parts (like) the same phenomenon became evident. This kind of movement is very strong in the U.S.A. Even in Texas the age of 47% of all farm hands is 65 years or more.

Further investigation might show how far all this is a consequence of the war losses becoming apparent now, and how much it is the consequence of the pull out factor of industrial full employment, or of other psychological factors such as improved general education, and also how far modernisation of agriculture has made it economically justified. In any case this vacuum caused by the shortage of young people is bound to show itself in the near future in great institutional changes in the agriculture of countries where it occurs.

### III Preservation of Peasant Way of Life

Agricultural inflexibility is often linked to the preservation of the "peasant way of life" based on tradition and post rationality of bygone techniques, where agriculture is considered as an art and not an economic activity based on scientific research and accountancy.

Peasant farmers, and other types of agricultural population show, no doubt, many cases of non-rational conservatism. But there are also cases where another rationality based on different principium rationis is imposed upon the agricultural population which rejects it. The reason for this rejection may appear conservative at first glance but may prove to be quite rational from the point of view of the peasant. Allegations of conservatism are sometimes too easily accepted, be it for reasons of preventing changes from taking place, or not admitting that things have already changed. Such allegations may serve also as a pretext for justifying imposition by force of changes against the interests of the agricultural population, or excuse for the failure of inadequate population policies.

More intensive research is needed to investigate "the way of life" and the "conservatism" of the agricultural population. Perhaps a definition stripped of the emotional and romantic shell, might be that of a large number of different services supplied by, and organised on, an agricultural family or village basis:

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economic, (productive, consumptive, transport, distributive, etc.) Protective, administrative, religious, health, educational, recreational, etc. It seems the village community movement is based on such multiple services, rationalised, modernised and multiplied, taking advantage of the non-utilised resources lying idle in the village.

Studying the process of the reduction of functions of peasant families in Yugoslavia we noticed the rigidity of some of them (with a low coefficient of variation) and the greater flexibility of others. Comparatively most inflexible were the biological functions of the family (number of family members, percentage of the population in matrimonial status, etc.) All functions connected with the problem of expanding monetary economy showed flexibility. Most flexible were those connected with a higher standard of living (spread of electricity, expenditure for various medical, cultural, etc., services). (16)

Pride and prejudice, honour and prestige in the environment could be transferred to economic language where conspicuous consumption plays a great role, but conspicuous production in traditional and modern ways should not be over-looked either. There are many instances where economic investment in capital goods was made with very little economic calculation but more for reasons of prestige: to have a good team of horses even though uneconomical on a small holding, or to have a stable or barn bigger than a neighbour, is the counterpart on the production side of such conspicuous consumption as a large and expensive house, family festivities (weddings especially), rich national costume, radio, television, motor scooter, etc. (17)

In connection with institutional inflexibility we shall deal in this paper with two cases of the "way of life". One is the "prejudice of growing one's own food", and the other is the "desire to have one's own implements and machines".

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(16) R. Bicanic, "Reduction of Family Functions in Peasant Families", Conference on use of statistical methods in sociological research. Beograd 1957.

(17) For reasons of ideological prestige horses were replaced by tractors in the first days after the revolution in Eastern Europe in many co-operatives where horses could have done the work more economically for many years to come. In an effort to keep the younger generation on the land in some countries e. g. Sweden, Austria, the farmers were advised by experts to buy tractors or cars where mechanisation was plainly uneconomical, in order to persuade the sons to stay on the father's farm.

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a) Growing one's own food is one of the fundamental principles of subsistence agriculture. Even when the economic calculus shows an evident loss the peasant family will still grow its own food however uneconomical this may be. The result is that some kinds of staple food are grown where much more rewarding crops could be cultivated, be it for economic or for natural reasons. These crops are preserved only for reasons of peasant prejudice based on the family institution as a consumption unit as closed as possible. Since the turn of the twentieth century Western European agriculture has moved away from this type of agriculture, and concentrated mainly on livestock and dairy intensive farming, relying for the supply of cereals on imports from abroad. Nevertheless in some countries the policy of growing one's own bread has become again, on the national level, the main bulwark of agricultural policy. Large subsidies given to staple food production, in order to make it adjustable to national needs under the existing institutional framework, represents the extension of the peasant prejudice from peasant family to national level for various reasons (strategic, full employment etc.)

In other countries (i.e. U.S.A.) where there is excess production of grain, grain producers are paid for not producing certain kinds (i.e. wheat, maize, rice). This policy of making individually profitable the idleness of resources however justified it may appear from a national point of view, is difficult to understand from an international standpoint, in a world where so many people are unable to satisfy their hunger, or even to produce their own food.

In the Soviet Union the policy of growing one's own grain led to the imposition of compulsory deliveries of grain all over the U.S.S.R., with the effect that the more intensive and advanced areas, such as the Baltic republics with intensive dairy farming, had to return partly to grain production in order to satisfy the policy of compulsory deliveries of grain. The rigidity of the system of compulsory deliveries caused a retardation in the production of livestock and dairy products, and even a general recession of agricultural production in zones which had long ago passed this phase of agricultural development. (18)

b) The Principle of Owning One's Own Implements and Machinery.

Peasant families desire to own their own implements and machines even when their capacity oversteps the organisational framework of the peasant family holding. This leads to the uneconomical use of machines and implements which means an excessive investment in an agriculture which is otherwise poor in capital.

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(18) In the last report of Mr. Krushchev of 17 June 1958 a change to a more flexible system of compulsory deliveries in this respect was proposed and subsequently introduced. Pravda of June 21 and July 1st, 1958.

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This over-investment then leads to under employment of capital goods at the same time that there is a great shortage of capital in other machines or other means of production. E. G. the capital investment in agriculture in Yugoslavia is 600 per hectare and in the U.S.A. 300 dollars per hectare (including land value). The investment in Yugoslavia is so much larger than in the U.S. to a great extent because of the great density of agricultural population (42 male agricultural workers against 4 in U. S. per 100 ha. of cultivated land). It is also caused by the particularly great number of family small holdings each wanting their own production and their own house. The use of the means of production has to adapt itself to the relatively stiff relations of ownership, and lack of other opportunities.

Particularly large is the number of ploughs in Yugoslavia in the private sector (i.e. peasant family holdings). There were in 1957 2,320,000 holdings with altogether 1,400,000 ploughs, or 60 ploughs per 100 holdings. But the area under plough was 6,960,000 hectares, or, counting as optimum utilization one plough per 10 hectares (which is very low) on an average 700,000 ploughs would be enough to work this area if a rational overall principals or distribution could be applied. This means there was an apparent over-capitalization in ploughs of 50%, i.e. half of the existing ploughs, rationally distributed, could do the work for which twice the number is used today. A similar (very general) comparison for India (counting the area sown more than once as a double) shows that on 100 holdings there are 75 ploughs, and that counting 10 hectares per plough some 13.5 million ploughs would be sufficient, therefore 59% of all ploughs could apparently be considered in excess. (19)

There can however be quite a different approach to this problem than the macroeconomic one. It can be approached from the microeconomic point of view of the peasant holding: to have the type of instrument corresponding to one's own liking and experience; to have it at the time most favourable for one's work; to be independent of other people's services, or not to have to pay excessive prices for such services, etc. Therefore it may pay to have one's own plough even in such general situations as previously described, and all peasants certainly wish to have them.

Some years ago Colin Clark estimated that the investment in tractors in Great Britain was carried to excess. Britain had the greatest density of tractors in the world per 100 acres of arable land, 2.5 times more than U.S.A., and 3.5 times more than France or Denmark. He attributed this mainly to the British taxation system which enables farmers to spend part of their taxable income on the purchase of machinery rather than pay it to the treasury, (20) as this expenditure

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(19) The quality of the ploughs is here not taken into account.

(20) Manchester Guardian, May 25, 1955.

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is exempt from taxation.

Unused, excess capacity exists in the U. S. as well in land, in machinery and in tractors. There is even a surplus agricultural population, as we shall see later.

There is also excess, unused capacity, due to institutional rigidity in the Soviet Union. This was officially admitted in 1958 when the Machine Tractor Stations were abolished. It was then said (21) that there were too many people engaged in the M.T.S., doubling the administrative line of the kolkhozes, often one M.T.S. serving just one kolkhoz. Expenditure for the superfluous personnel amounted to 4.8 mrs. roubles, as they worked only seasonally and had to be paid all the year round. Altogether, on an average, one quarter of all M.T.S. (i.e. 2,250 M.T.S.) served up to no more than 5 kolkhozes each in 1955. M.T.S. machines had to work from 10 to 100 kilometres from their stations, and depreciation of machines was premature causing excess expenditure for repairs. Allocation of inappropriate types of machines was not infrequent. The M.T.S. had full monopoly of large machines, they were expensive and did not serve the kolkhozes at the right time, nor with the proper service. Yet the stations had adverse balances which had to be met by the state. It was estimated that the kolkhozes could use machines much better, and do the same amount of work with 80% of those used by the M.T.S., which represented a relative over-investment in tractors of 20%.

This institutional change could not be carried out for many years because of administrative rigidity, caused by the ideological stiffness of the agricultural policy makers. The reasons given were that it would mean a retreat from state ownership to the lower level of socialist property. (22)

In Yugoslavia experience with M.T.S. was so unsatisfactory that they were abolished in 1950.

### III Institutional Influence on the Agricultural Terms of Trade

It is too often assumed that agricultural producers face a market of perfect competition (23) because they are, to a very great extent, small producers who

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(21) Mr. Krushchev's speech, March 1, 1958.

(22) J. Stalin, Economic Problems of Co-operative Ownership in Socialism, pp. 96 - 104.

(23) We are far away from perfect competition in agriculture as this definition shows: "... in an adjusted agriculture individual farms would be producing the products in which they had greatest comparative advantages, farms would be of such size that unit production costs were at a minimum, inputs would be used in such combinations and

(continued:next page)

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cannot influence the market prices by the small quantities which they offer for sale, and that for this reason their production is not influenced by prices, though it is admitted without controversy that they buy goods at the monopolistic price level.<sup>(24)</sup> These statements only partially correspond to facts, as the inability to influence prices by producers occurs also where monopsonic tendencies are prevalent, as is the case in most agricultural markets.

Monopolistic and monopsonistic dominations depend on the size of the markets, and are observable even on small local markets. The technique of trade should not prevent us from noticing the essence of this kind of imperfect competition. Improved competition already represents a higher level of economic development.

In a capitalist, developed country, with sufficient capital available, large storage facilities, a developed transportation system, and a fairly large and transparent market, these monopsonic tendencies are not so obvious. Nevertheless agricultural protective organisations in this field, such as sales co-operatives, public warehouses, credit and market control, etc., are the best proof of the existence of such monopsonistic pressures though they are partly neutralised or checked.<sup>(24a)</sup>

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(23) (contd.) amounts that marginal costs equalled marginal revenues, and both quantities of resources used in agriculture and the volume of farm input would be such that market prices enabled earnings of labour and capital in farming to be comparable with those outside of agriculture, nonmonetary factors taken into account." G.E. Grandew, "Alternatives to Orthodox Programs and Goals of Agricultural Adjustment", Journal of Farm Economics, 1957, p. 1634.

(24) Policy for Commercial Agriculture, Report of the Sub-Committee on Agricultural policy to the Joint Economic Committee Congress of the U.S., Feb. 10, 1958, p. 3, 12, 17.

(24a) Cf. in particular the striking analogy which R. Vining finds between the workers' Trade Unions, and the farmers organisations practices. Vining's main idea is that farmers in U.S. should get stability of income through organisation as workers get it through their trade unions, and big business in monopolies. He defines stability as a fixed relationship between two calculations. He compares mandatory co-operative marketing to the T.U. closed shop; collective bargaining of farm co-operative and industrial management in setting up commodity prices, to T.U. bargaining for wages; the parity principle to the escalator clause in labour clause contracts; rules on the assignment of allotment acreage to the seniority rule. Surplus production and surplus acreage for him are similar to labour unemployment or idle resources in industry. Rutledge Vining, Parity, Price and the Farm Problem, AER, Supplement 1958 p. 343 ff.

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The recent spread of contract farming in U.S.A., Sweden and U.K., etc., certainly strengthens the monopsonic tendencies. It somewhat freezes the demand over a certain period giving the farmer certainty and elimination of risk. The agricultural producer prefers to renounce for a limited time his managerial function to manoeuvre on the market as a seller and concentrate on combinations of the factors of production. He gains more stability in his money income and the possibility of making larger and more expensive investments. The managerial decision making and risk taking over by big business ("agribusiness") capitalist corporations operating on a large scale. (25)

The purchase of agricultural products for the "ever normal granary", strategic stock-piles, emergency reserves, communal feeding, foreign aid, etc., provides other institutional forms of agricultural trade which relieves monopsonistic pressures by increasing the demand for agricultural products.

There is in America strong criticism of the present American agricultural policy. Price support is criticised that it benefits only large farmers, that it discourages the "natural movement" of farm population out of agriculture (the "natural" principle being: "get bigger, get better, or get out"), that it increased the government cost of storing and acquiring surpluses (amounting already to 7,3 milliard dollars), and that higher prices caused the loss of foreign markets. (26) From 1932-1956 22.5 milliard dollars were spent for agriculture (net cost) of which one half went to stabilise prices and incomes. This amounts at present to round 2 milliard dollars a year. (27) The efforts to get land out of production through the Soil Bank mechanism cost the Federal budget in 1957 one milliard dollars for 83,000 conservation reserve contracts. Nevertheless the aggregate net income of farmers operators declined from the peak year of 1949-56 by 34%, and, as there were fewer farms, the decline per capita was only 6%, while the overall increase of income per head in U.S. amounted to 37%. Thus the still greater flexibility

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(25) Such a farmer was wittingly called an "agricultural foreman" by D. F. Capstick, conference of Southwestern Economists, Dallas (US) 1958.

(26) For recent discussion of the problems of American agricultural policy see particularly American Economic Review (Suppl. 1958) Address, articles and discussion of J. D. Black, W. Wells, R. Vining, E. J. Working, etc. The Compendium Policy for Commercial Agriculture connected with the U.S. Congress Hearings Dec. 16-20, 1957; Journal of Farm Economics, Dec. 1957, articles by J. D. Black, J. Brandon, E. O. Heady, etc. Committee for Economic Development Toward a Realistic Farm Policy.

(27) U. S. Department of Agriculture, Realised Cost of Agriculture and Related Programmes, March, 1957.

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of incomes than farms made life of those remaining on land possible at a little under the previous level. Those outgoing (about one and a half million farms, and 3 million people) found employment outside agriculture more profitable. (28)

The policy did not achieve the adjustment of demand to production, private demand for agricultural products was not expanded and therefore surplus stocks increased. In order to get rid of them a double price system has been introduced for exports, and great quantities sold or freely given away as aid or grants.

The acreage decreased, but more intensive farming of these parts under cultivation actually increased the total volume of production. (29) Rigidity of soil allotment was offset by flexibility in capital. Moreover the more flexible and non-restricted crops, (barley, sorghum and soyabeans) were substituted for restricted crops and their production greatly increased.

Most critics agree on one thing, that the basic problem is that of institutional inflexibility. "All of the people now in commercial agriculture using all of the land, machinery and other resources they are now using, could not earn reasonable incomes at free market prices for their products." (30)

One is impressed by the fact that the main practical proposals for new agricultural policy measures are restrictive, limiting production, nationalistic in character, solving the problem within national frontiers rather than by expansion of demand and of production. One is tempted to ask what kind of income and

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(28) T. Schultz is of the opinion that the main cause of the maladjustment of agriculture in U. S. is not in the unsatisfactory allocation of land but in the labour force which is still too large, although it has sunk to a bare 12% of the total active population, and been reduced by 3 million since 1940. T. S. Schultz "Economic Prospects of Primary Products", p. 22, Round-table of the International Economics Association. I am indebted to Prof. Schultz for giving me this paper before it has been published. Rio de Janeiro, 1957.

(29) According to Dr. B. T. Shaw the American agriculture produced in 1957 about 40% more from the same acreage as in 1939. Wheat production is 27% more on 17% less land, maize 32% more on 17% less land, and the cotton acreage though reduced by 45% yielded 95% as much cotton as in 1939. A similar trend is shown by Dr. F. Wahlen in Western Europe, where the area was reduced, the labour force cut by one-fifth and at the same time the volume of production rose by 20%.

(30) C.I.D., Toward a Realistic Farm Program.

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price levels would be reached if a break through the existing price-cum-income monopolistic circle could be achieved, and full use of productive resources could be envisaged for agriculture.<sup>(31)</sup>

There are some experts who think that in order to achieve income parity in U. S., the agricultural population would have to be halved (from 20 to 10 million, and the number of farms reduced to almost one-third, 2.2 million). If such a tremendous change be the price to achieve inflexible income, what would be the price to achieve full use of productive capacity? <sup>(32)</sup>

2) In underdeveloped countries the monopsonistic tendencies are much more developed, and their institutional character more visible. The markets with strong imperfect competition are most obvious on the lowest level of the local (village) market. The barriers to the entry of new buyers to the market are often limited by custom, local or government regulations, and also the position of monopsonistic buyers strengthened by government pressure for taxes in money, particularly in the colonies. The personnel for this trade often represents an extension of tribal or village organisation, where the local chiefs assume this position of monopsonistic buyers of agricultural products. On the other hand some marginal individuals or traders' elites, strongly bound by their loyalties, form potent monopsonistic and monopolistic groups, based on social deviance.<sup>(33)</sup>

The narrow markets, loosely integrated, the deficiency of storage in the hands of the producers, the consumers, and the dealers; and the shortage of capital restrain to some extent the monopsonistic tendency. On the other hand it is strengthened by restrictive trade practices, the transportation bottle-neck and many institutional elements such as lack of sellers' organisations and the splitting of

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(31) Such an experienced expert as L. H. Bean estimates America's capacity to produce in agriculture by referring to a possible increase of acreage of 40% and of production of 50%. "Agricultural Capacity, America's Needs and Resources, 1955, p. 810-812.

(32) J. A. Baker, "Full Flexibility will not Solve the Farm Income Problem" Policy for Commercial Agriculture, p. 466.

(33) For the most recent description of this behaviour see B. Hoselitz, Sociological Approach to Economic Development Atti del Congresso Internazionale di Studi sul Problema delle Aree Arretrate, 1956, p. 755-78. See also Economic Growth and Development, American Economic Review, Suppl. 1956, p. 37.

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solidarity for non-economic reasons (different tribes, racial groups, villages, nationalities, etc.). The trader-cum-moneylender is often in complete control of an area's contact with the outside world (controlling even the post and letter writing where there is a high degree of illiteracy).

The very rigid institutional elements on the lowest level show a gradual weakening as one approaches the higher level of market organisation, where capitalistic market practices prevail upon the rigidity of local markets. (34)

Institutional rigidity enables those in control of the market to impose prices which are arbitrary and depend on their "free will" and unrational interests. The result is an unstable system of prices showing sometimes several hundred percent difference over very short distances or periods of time.

Our survey of price variations in Croatia in 1939 after the harvest established that prices paid to the peasants for wheat on local markets differed from 70 to 165 dinars, and for maize from 90 to 202 dinars per 100 Kg. (35)

The position is aggravated by a great number of intermediaries, whose gains are always shifted to be borne by the weakest link in the chain, the peasant small producer.

Thus the greatest exploitation of the peasant producers takes place even before their goods reach the market operations of wholesale commercial prices. From that point regular commercial operations take place.

3. In the Soviet type countries the trade in agricultural products is rigidly institutionalised, except for the kolkhos market. The state purchasing agencies, operating under administrative rules are in administrative and economic control of the institutionalised markets, with planned or government fixed prices and "hard" norms of deliveries for each kind of institution (compulsory deliveries, payments in kind, M.T.S. services, state contractual deliveries, state purchases) and the income is distributed according to stiff administrative rules, different for each kind of institution.

The results of this institutionally and ideologically rigid Soviet price policy was that "up to 1953 the purchasing prices for the most important products

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(34) For a description of such local monopolistic and monopsonistic markets see All India Rural Credit Survey Vol. III, the General Report 1954, pp. 100-106. For West Africa cf. P. T. Bauer, West African Trade, Pt. 3 and Pt. 7. For pre-war Yugoslavia see R. Bicanic, Kako Zivi Narod. (How people live). p.

(35) R. Bicanic and others, Na'muznije narodne potrebe, 1940.

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were low, they did not repay the labour and material costs, and did not secure the minimum conditions for the development of social production". (36)

The slow increase of agricultural production in the socialist sector was the consequence of this inflexibility.

This rigidity imposed upon the agricultural producers, who were firmly organised into kolkhozes, had grave consequences. The producers were not interested in increasing production, livestock production in particular lagged neglected behind total agricultural production, there was price discrimination against the kolkhozes. The goods sold to the kolkhozes were sold at the retail prices, while the sovkhos made their purchases at wholesale price. There were some unexpected results. There was an increasing difference between the biological harvest on the fields, and the harvest in the barns. On an average 20 per cent managed to leak between field and barn. On the other hand the kolkhozniks' plots which were institutionally considered as complementary sources of kolkhoznik family food, grew into a major source of marketable food. The peasant families, reduced to small plots of land comprising only 4.3 percent of the total sown area, showed such vitality that their spontaneous production achieved a faster rate of growth than the planned production of the common kolkhoz fields. Kolkhoznik plots were responsible for as much as 45 percent of the total production of potatoes and vegetables, 46 percent of the cattle (56 percent of the cows), 40 percent of the pigs and 83 percent of the goats. (37) See also comparative figures for compulsory deliveries to the state of kolkhozniks from their plots of 19 percent of all meat, 16 percent of milk, and 11 percent of wool. Dividends and money income of the kolkhozniks from the common land brought them in 1957 43 milliard roubles and sales on the kolkhoz market 37 milliard roubles. (38) These deliveries were abolished from January 1, 1958. The total volume of trade in food increased from 1940-1955 in the state and co-operative shops from 100 to 143 index, and in the kolkhoz market to 168. The prices increased in the former to 141, and in the latter to 111 index only. (39)

Institutional rigidity on one hand pushed the peasants to find an outlet for individual activity on the other. (40) The rigid institutional set up of prices

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(36) Krushchev report to the Central Committee of the C.P.S.U., Pravda, June 17, 1958.

(37) FAO The State of Food and Agriculture, 1957, p. 116.

(38) U.N. Economic Survey of Europe in 1957, pp. 1, 10, 1.25.26, ECE Economic Survey of Europe in 1957, p. 1.10.

(39) Calculated from data of retail trade, food and indices of prices, Narodoe hozyaystvo SSSR, 1956, pp. 201, 207, 210, 215.

(40) One is inclined to ask oneself what increase of agricultural production in U.S.S.R. would take place, particularly in the critical livestock and dairy, fruit and vegetable production, if, any, the kolkhozniks plots were to be doubled to 8.6 percent of the total sown area, or from 0.3 to 0.6 ha. per family. What a release of administratively blocked production forces this flexibility could represent.

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and volume of production leads to the appearance of non-normative markets. They are both linked, like a system of double flasks in hydromechanics. The greater the rigidity of one part of the institutional framework, the greater the pressure for flexibility in another market. One cannot help remembering the distum of A. G. B. Fisher "The more stablization the less stability". (41)

The large expansion of sown areas of new virgin fields in Kazakstan and Siberia did not give results as expected, so the main interest of Soviet agricultural policy turned to intensification of agriculture. For this purpose the rigidity in agriculture has had to be softened, and considerable reforms for the improvement of unsuccessful institutions carried out.

The new system of prices and deliveries to the State, introduced in July 1958 (42) means a considerable weakening of institutional differences, and a strengthening of the uniformity of the price system for products bought and sold by kolkhozes. The principle is accepted that agricultural products should not be sold at less than costs, and the prices should enable the kolkhozes to make their own investments, accumulate funds for that as well as for their contributions to investment in heavy industry. Prices must be stable and flexible at the same time, depending on the outcome of the harvest. The principle of direct material interest of the kolkhozes and the individual kolkhozniks is stressed, and the kolkhozes left to sell all produce which the State does not take, on the kolkhoz markets. Nevertheless compulsory quotas of deliveries are all centrally planned and the prices are fixed according to zones of production. The price leadership of the sovhozes is established, although in 1956 only 28 percent of all sovhozes had a positive financial balance. (43)

On the whole the reform is on the line of strengthening the market forces, but it can develop in many different ways increasing the role of the kolkhozes, or turning them into less effective sovhozes.

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(41) "The more we provide a formal stability in this way (i.e. piecemeal) for selected industries, the more we concentrate the necessity for flexibility upon the other sectors of the economy left outside. Fluctuations which apart from efforts to impose partial stability in the selected industries might have been quite manageable are therefore likely to be converted into violent convulsions." A. G. B. Fisher, Economic Progress and Social Security, p. 202

(42) Krushev, Report to the Central Committee C.P.S.U.,

(43) S. Nedelia, Finanzy S.S.S.R., P. 35.